Gas Journal

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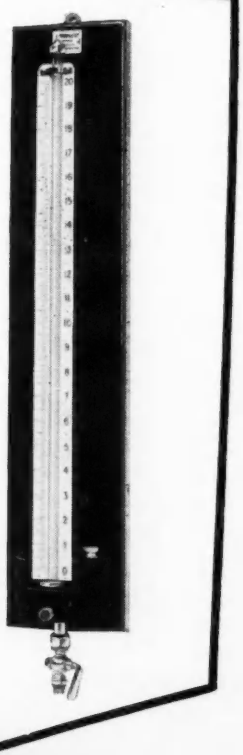

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Gas Journal

VOL. 295 NO. 4959 30 JULY, 1958

110TH YEAR

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illustration by courtesy of H. E. Wingfield & Co.

something in common

They remind one of different worlds, the 1d. black postage stamp of 1840, and the modern T.G. meter. Yet, they *have* something in common—both are the products of true craftsmanship. First issued on 6th May, 1840, the 1d. black was printed by Perkins, Bacon & Co. from an engraving by Frederick Heath. The design was based on a watercolour by Henry Corbould from the City Medal engraved by William Wyon, and is presented as a fine example of the engraver's art. The T.G. meter epitomizes craftsmanship and the T.G. 'G' prepayment mechanism is accepted as the most modern precision movement on the market.

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Gas Journal

VOLUME 295. No. 4959 JULY 30, 1958. 110th YEAR

White Lund in Profile

REALISATION of the North Western Gas Board's integration scheme in their Northern Group took a step forward last week with the opening by Sir Ian Horobin, Parliamentary Secretary to the Ministry of Power, of the White Lund works between Lancaster and Morecambe. This is a particularly difficult region to bring into a grid system since in it there are a number of small undertakings situated in sparsely populated mountainous country, each of which before nationalisation may well have been run by one man. The only industrialised parts of the Group are the sections round Lancaster and Barrow and, to a much smaller extent, Kendal. The holiday resort of Morecambe is responsible for a useful summer load to balance out the normal seasonal decrease in demand. Barrow, situated as it is on the north western limb of Lancashire, forms the centre of a natural subgroup of undertakings in Furness which have been integrated separately into an automatically controlled unit centred on the control room at Barrow. The remainder of the Group, including the Lake District and the undertakings on the Yorkshire border, will eventually be supplied from the new works at White Lund by a phased programme of integration.

The idea of building a gasworks on this site was first put forward in 1939, but nothing came of it until after the war when both the Lancaster and Morecambe undertakings applied to the then Ministry of Fuel and Power for additional plant. The Ministry insisted that any plant extensions must be considered jointly by a combined committee from both Corporations (both undertakings were municipally owned) and a site at White Lund was chosen.

When the industry was nationalised, the foundations of a water gas plant had been laid. This was subsequently completed and has been supplying peak load gas. The North Western Gas Board were then able to consider how the White Lund site could be developed to the full. With the Board's far greater resources of potential capital and expert personnel, full advantage could be taken of what was virtually a 'green field' site. Investigation showed that the site chosen was not suitable since it had been a rubbish tip for a number of years and combustion was still taking place. The Board were, however, able to obtain a derelict site adjacent to it on which a shell-filling factory had been built during the first world war but had later been demolished by a severe explosion. The cost of clearing the site would probably be high but the result would justify this because little additional civil engineering work would be necessary, other than filling to the predetermined datum level.

The development of the present White Lund site, which we describe at length in this issue, may be justly described as a triumph of planning and an experiment in modern industrial architecture. Good, well-thought out planning takes time and in this case the time taken to acquire the site probably contributed to the exceptional amount of thought which went into the design of the buildings and the placing of individual items.

We think that the Board have been remarkably successful in both these directions. The site is an almost perfect rectangle of about 24 acres adjacent to which lies a site of seven acres holding the railway sidings. The main site allows full scope for the most economic arrangement of plant units, ample storage space for coal and coke, plenty of space for the duplication of the carbonising plant at some future date and a remarkably clean atmosphere in the works area. Wagons are brought up from the sidings as needed and returned empty or filled with coke, which helps to keep the works free from dust. The works buildings are of unusually pleasing design, and particular care has been taken with the design of the chamber house and its immediate ancillaries. The combination of rustic brick cladding and unpainted aluminium sheeting has the effect of giving to the appearance of the building a weathered mellowness and taking away the massive solidarity characteristic of so many modern retort houses. The use of aluminium sheet, though expensive in first cost, it likely to show considerable saving in maintenance charges and should prevent the plant looking shoddy in the years to come.

It is, we think, a sign of the times that the Fine Arts Commission should have taken part in the design of this building and that they were able to produce a design which was acceptable to the local planning authority and to the technical needs of a carbonising plant. This is equally true of the water gas plant building which has been designed by the Lancaster City Architect. This is of pleasant appearance, spacious, and has the great asset of a sound-proof blower room.

The rôle of this works is essentially to supply gas to other undertakings. In this it is similar to other new works built in the North Western Board's area since nationalisation, such as Denton and Lostock Hall, but on a smaller scale. White Lund has made it possible to discontinue gas-making in Lancaster and Morecambe, but the gas storage capacity in both these places is being fully used. Gas is also being compressed at White Lund for transmission to the outlying parts of the Group for local storage. The comparatively small holder of .75 mill. cu.ft. capacity at the new works is likely to be deceptive for the casual visitor who might very understandably think the works is very much smaller than it actually is.

Under the present system of working it has a potential output of 6 mill. cu.ft. per day from three benches of chambers. A further bench can be added to complete the capacity of the present chamber house with no dislocation to the working of the plant. The building of this works is likely to add to the amenities of the district by assisting in the implementation of the Clean Air Act, since the Lancaster area has always been a big consumer of coke and the new works should prove itself able to produce it entirely smokelessly.

Secretary's Day

HIRED any good secretaries lately? If you have, then don't let them hear about the peculiar event known as 'Secretary's Day.'

This celebrates the birthday of the world's first secretary to use a 'writing machine,' Christine Sholes, whose father, C. Latham Sholes, invented the forerunner to the modern typewriter in 1873. To mark the inauguration of Secretary's Day, a nation-wide survey has been launched to discover 'Miss Secretary of 1958.' The United Kingdom has been divided into six regions, Scotland and Northern Ireland, Wales, North England, the Midlands, South-west England, and London and South-east England. In each region, secretaries are being invited to obtain questionnaire forms from local branch offices of Remington Rand, Ltd. These forms list a number of qualities and skills which go to make up the perfect secretary. Contestants are asked to indicate the most important six qualities and to give their reasons for their selection.

Those whose selections and reasons agree with those already made by a panel of business efficiency experts will be invited to attend for a written and oral examination in their respective regions. They will be examined and interviewed by a panel of three local judges, comprising a civic dignitary, an educationalist, and a senior executive from the Remington company. Each of the six regions will provide a 'Miss Secretary.' These six regional Miss Secretaries will then compete for the national title in London on September 30. The successful candidate will be flown to New York for a stay of one week and also be given £100. An electric typewriter will be presented to her employer. The second award will be a flight to Paris for a stay of one week, plus £50. The four runners-up will each receive a portable typewriter. Besides an ambitious social programme, the winner will meet leading American business executives during her stay in New York. 'Secretary's Days' have been established in Argentina, France, Sweden, Norway and Denmark.

Now you know why you mustn't let your secretary hear about it. You might never see her again!

'All Lit Up' for Edinburgh

MAKING commercial films is a tricky business. It is necessary to combine technical excellence with strict adherence to the fundamental object of the film; all too often one quality is sacrificed to the other. A film which scores heavily on both counts is the Gas Council's six-minute colour cartoon 'All Lit Up,' which we praised in these columns a few months ago. Landed with the job of making a light-hearted feature on the gas poker, the most inventive film maker might be pardoned if he felt some misgivings. That Messrs. Halas and Batchelor accepted the challenge and went on to produce a superb cartoon with a lively calypso sound track is enormously to their credit, and it is pleasant to be able to record the fact that 'All Lit Up' is one of three films by this team which have been accepted for showing at the Edinburgh Festival in the short film category.

Last week we had a further look at this delightful cartoon, along with two other recent additions to the Gas Council's film library. Of these, 'Smokeless Fuel Conversions' is a rather humdrum (although no doubt adequate) film made to show architects, builders and members of local authorities how the gas industry can assist when old-fashioned grates are converted to burn smokeless fuels. The other film, 'Burning to Serve You,' is a shortened version of one of the Gas Council's sales training films, adapted for public consumption. Excellent though the film was in its original version, we do not consider this rehash to be particularly good gas publicity.

However, no one can expect a film-making organisation to hit the bullseye every time. In our view one film like 'All Lit Up' outweighs a couple of less exciting—and no doubt less expensive—productions. Incidentally, the showing of 'All Lit Up' is not the first honour to be accorded a Gas Council film. In 1954 'Family Album' was screened at the Cannes Film Festival.

Refrigerator Boom

SOMETHING has happened to the refrigerator business. Sales have suddenly started to climb in a spectacular way and it seems as though the public is at last responding to the refrigerator industry's publicity. But there is more to it than that. The public still has plenty of money to spend, and with the comparative saturation of the television market emphasis is again being placed on the 'snob value' of the refrigerator. Moreover, the benefits to health (and pocket) of refrigerator-stored food and the advantage of being able to store frozen foods temporarily have been realised.

Excellent as this growing acceptance is for all concerned, it has not solved the problem of the 'close season' which adds to manufacturing and storage costs. In the gas industry particular emphasis is being placed on evening out the spring and summer peaks. The North Thames Gas Board, for example, ran a highly successful refrigerator sales competition from December 1, 1957, to March 31, 1958. The competition was open to employees in three categories—non-selling staff, showroom representatives and district representatives—and the winners in each category received their prizes (of refrigerators, appropriately enough) at a gathering at the Kensington Palace Hotel last week. Under the chairmanship of the Board's Commercial Manager, Mr. S. G. Aberdein, speakers included Mr. S. Broughton, Managing Director of Electrolux, Ltd., Mr. P. D. M. Aird, Managing Director of R. & A. Main, Ltd., Mr. C. F. Richards, Joint Managing Director, Morphy-Richards, Ltd., and Mr. Gordon Madge, Deputy Commercial Manager, who analysed refrigerator sales trends.

Personal

DR. THOMAS NICKLIN, North Western Board Chief Scientist, has been awarded the Degree of Doctor of Philosophy in the Faculty of Science, at London University, for work on 'Heat Transfer in Packed Beds.' Dr. Nicklin, who is 42, received his early scientific training at Loughborough College. He gained his B.Sc.(London) in 1936, and his M.Sc.(London) in 1950. He became an A.M.I. Chem. E. in 1941, and is a member of the Institution of Gas Engineers. Before joining the gas industry Dr. Nicklin worked first in an oil refinery, then as Technical Assistant in Stewart's and Lloyd's coke oven plant at Corby, and later as Chemical Engineer in W. C. Holmes and Co. Ltd. In 1945 he joined the United Kingdom Gas Corporation as Production Engineer. When this was vested in the North Western Gas Board he was appointed to a similar position at the Board's Headquarters. He was appointed Chief Scientist in 1957.

Dr. Thomas Nicklin

MR. JOHN HARVEY has been awarded the newly instituted Falconer Birks Scholarship by the North Thames Gas Board. MR. MICHAEL HOLT has won the Milne-Watson Scholarship.

The EARL OF BALFOUR OF WHITTINGEHAME, East Lothian, has been appointed part-time Member of the Scottish Gas Board from September 1, 1958.

MR. R. T. HAYES has been appointed a Director of the United Coke and Chemicals Company.

MR. HARRY SHERBURN, who for the last eight years has been Managing Director of the Grappenhall and Palatine works of Radiation, Ltd., at Warrington, has retired after 57 years of continuous service with these Companies of the Radiation Group at Warrington. Mr. Sherburn will for the time being act in a consultative capacity to the Radiation Board. At a recent ceremony at Grappenhall works, Warrington, the Chairman of Radiation, Ltd., Mr. W. Donald King, made presentations to Mr. and Mrs. H. Sherburn to mark Mr. Sherburn's retirement. Mr. Sherburn handed the presentation to the Richmonds Benevolent Fund. It had been subscribed to by all sections of Radiation and friends and well wishers from the gas industry. MR. W. H. CHRISTIE, who for some years has been in charge of the Production Centre at Leeds, has been appointed General Manager at Warrington.

MR. D. A. CAPPER has been appointed Assistant Solicitor to the North Western Gas Board. Mr. Capper, who has been with the Board since 1954, passed the Final Examinations of the Law Society with Honours in April this year. He was awarded his Bachelor of Laws Degree with Honours at Liverpool University, and was called to the Bar before becoming articled to the North Western Gas Board's Solicitor, Mr. Colin Smettem.

Mr. D. A. Capper

TWO COMPANIES TO MERGE FOUNDRY INTERESTS

THE Boards of G. & J. Weir, Ltd., and Catton & Co., Ltd., have decided to combine their foundry activities by forming the new Company, Weir-Catton, Ltd., to acquire the capital of Catton & Co., Ltd., and the capital of the Argus Foundry, Ltd., a wholly owned subsidiary of G. & J. Weir, Ltd.

The share capital of Weir-Catton, Ltd., will be owned as to 50% by G. & J. Weir, Ltd., and as to 50% by the existing shareholders of Catton & Co., Ltd. It is hoped that the new Company will be formed before September 30, 1958.

Under the new arrangement the name of the Argus Foundry, Ltd., will be changed to Weir Foundries, Ltd.

Obituary

MR. HARRY ELLISON, for many years a prominent figure in the chemical industry and founder Chairman of the Yorkshire Tar Distillers, Ltd., has died, aged 86. Mr. Ellison gave £50,000 to the University of Leeds in 1943 to create an endowment fund for the provision of post graduate fellowships for research in pure and applied chemistry and in physics.

Gasworks Fire Threatens Homes

POLICE warned people in nearby houses to leave their homes when fire broke out at Arbroath gasworks recently. There was danger of the fire spreading to two storage tanks containing 2,500 gal. of gas oil.

Workmen had been replacing an old smoke stack in the water gas plant, and it is believed that a spark from an acetylene burner set alight oil in the filter tanks. The roof of the plant was badly charred, but the supply of gas was not affected.

Part 2 of W.M.G.B. Methane Drainage Plan Completed

THE second part of the joint scheme between the National Coal Board and the West Midlands Gas Board to utilise methane drained from mine workings in North Staffordshire has now come into operation.

Last October the scheme was inaugurated by linking Wolstanton colliery with Etruria gasworks, Stoke-on-Trent. The completion of the second stage brings Holditch colliery, Newcastle-under-Lyme, into the system.

Together, the two collieries—Wolstanton and Holditch—are supplying Etruria gasworks with well over 1 mill. cu.ft. of methane a day.

At each colliery the methane is drawn from the underground workings and is pumped through specially laid mains to Etruria gasworks. Here it is mixed with the correct proportion of coal gas for adjustment to the declared calorific value.

On the basis of calorific values this represents a saving in coal of up to 1,000 tons a week. The gas drawn from the two mines is sufficient to supply a town almost the size of Newcastle-under-Lyme.

Plans are going ahead to extend the scheme still further to include Chatterley-Whitfield, Stafford, and Hem Heath collieries, all in North Staffordshire.

DUKE TO BE PATRON OF CLEAN AIR CONFERENCE

THE Duke of Edinburgh is to be patron of the International Clean Air Conference and Exhibition to be held in October, 1959, to mark the Diamond Jubilee of the National Society for Clean Air and of the clean air movement in this country.

The President of the Society, and of the Conference, will be Sir Hugh Beaver, Chairman of the Government Committee which made the recommendations on which the new Clean Air Act is based.

The exhibition to be held in conjunction with the conference (both will be at the Seymour Hall, London, W.1) will be largely of a technical and educational nature.

INTEGRATION PLAN FOR DEVON

A PROPOSAL is under consideration for the centralisation of gas production in North Devon at a new plant which, it is suggested, should be built at Yelland works of the South Western Gas Board. This would mean the closing down of the Ilfracombe, Barnstaple and Bideford works.

The plan would save labour costs and would probably mean cheaper gas for the area.

Scotland's First Clean Air Order Confirmed

SCOTLAND'S first Smoke Control Area Order has been confirmed by the Secretary of State for Scotland. The area is at Sighthill, Edinburgh, and covers about 138 acres.

From January 1, 1959, if smoke is emitted from a chimney of any building within the area the occupier of the building will be guilty of an offence and liable to a fine, not exceeding £10, unless he proves that the emission of smoke was not caused by the use of any unauthorised fuel. Authorised fuels include coke, electricity, gas, briquetted carbonised fuels, anthracite, and semi-anthracite.

Proposals for smoke control areas are at present before the Secretary of State for the centre of Glasgow and for parts of Dumbarton, Dundee, Kirkcaldy, and Coatbridge. Other smoke control areas will be introduced gradually.

In addition to the Sighthill smoke control area there is already in Edinburgh a smokeless zone at Sighthill, set up under the Edinburgh Corporation Order (Confirmation) Act, 1950, which includes the Sighthill industrial estate.

Edinburgh Corporation's Health Committee has decided to introduce a bye-law requiring new buildings to be equipped with appliances capable of burning smokeless fuels, and making installation of gas-ignition points obligatory.

Pictured above are three benzole storage tanks immediately before their despatch to the Grimesthorpe works, Sheffield, of the East Midlands Gas Board. These tanks are part of the Holmes benzole recovery plant which is being installed at this works.

Change of Address

From August 11, Kelvin & Hughes (Industrial) Ltd., will move their administrative offices from 2, Caxton Street, Westminster, London, S.W.1. to their new building at Empire Way, Wembley, Middlesex. Telephone—WEMbley 8888; telegraphic address—Kelhue, Wembley.

Inflation in Uruguay Affects Montevideo Gas Company

IN his statement at the 86th annual general meeting of The Montevideo Gas & Dry Dock Company, Ltd., in London recently, Mr. G. D. Paton, the Chairman, warned that the authorities in Uruguay had been unable to arrest inflation with its inevitable effect on the exchange value of the peso.

Unless and until their efforts met with success the Company and others with sterling investments in Uruguay were powerless to avoid the grave losses caused by exchange depreciation. Immediate prospects were not encouraging.

Had it not been for an exchange loss of £60,438, operations during 1957 would have resulted in a profit of £21,472. The gas department operated at a loss until August, when the increase in the gas tariff restored it to a profit-earning basis.

There were substantial increases in wages, salaries, and many other items of expenditure, though there was a welcome reduction in cost of coal from the very high level of the previous year.

The volume of gas sold showed little change, but there was a reduction in average sales per consumer. Sales of residuals were maintained but appliance sales were adversely affected by a lack of supplies due to restrictions on imports.

Negotiations continued in an endeavour to find a basis, satisfactory to the authorities and the Company, whereby changes in the price of gas could be authorised without the frustrating delays experienced in the past.

With inflation continuing, further increases in costs might occur which, under present conditions, it would not be possible to pass on immediately.

Borough Polytechnic

Courses on fuel technology, fuel and combustion engineering, and oil burning technology, are offered by the Borough Polytechnic.

Management Study

The Department of Management Studies of the Regent Street, London, Polytechnic has issued details of this year's autumn courses. They fall under four headings — Economics, Finance, and Accounting; Work Study and Office Management; Communication; and Human Relations.

NEW D.S.I.R. STATION NAMED WARREN SPRING LABORATORY

THE new D.S.I.R. station being built at Stevenage is to be called the Warren Spring laboratory. The name is taken from a lane that used to run across the site.

The Council for Scientific and Industrial Research have expressed the view that the Warren Spring laboratory should be a versatile station, free to do work on any subject which becomes important for the nation and which cannot be fitted into the programme of another research body.

It has already been decided that work will be carried out on air pollution; on the synthesis of oil and chemicals from carbon monoxide and hydrogen; and on mineral processing. The new station will, in addition, be free to take up any research requiring staff and facilities of the type that are being provided.

The Director of the Warren Spring laboratory will be Mr. S. H. Clarke, C.B.E.

New Scots Plant

The Scottish Gas Board's new plant at Provan gasworks, Glasgow, is to be inaugurated by the Lord Provost of Glasgow, Mr. Myer Galpern, on August 11. The inauguration will be followed by a luncheon in the Glasgow City Chambers.

Sir John Cass College

The 1958-59 prospectus of the Sir John Cass College has now been published. Dates of the terms are September 22 to December 13, 1958; January 5 to March 21, and April 13 to July 4, 1959.

M.P. ASKS QUESTION ON UNDERGROUND GASIFICATION

REPLYING in the House of Commons recently to Mr. H. Neal (Lab. Bolsover) who asked if the experiment in underground gasification at Newman Spinney was successful and whether a commercial power station would now be erected, Mr. R. Maudling, Paymaster-General, replied that it was still too early to say whether this experiment would be successful and whether a commercial power station would be erected.

Mr. Neal reported: 'The Paymaster-General says that it is too early. After nine years of experimentation in this direction, does he not think that it is time that some commercial results were obtained, or should the idea be written off as a complete loss?'

Mr. Maudling: 'The National Coal Board is doing all it can, but it is a difficult project. The Board has studied experience in other countries. It still believes that it is worth going ahead.'

THE GEORGE COHEN 600 GROUP LTD.

COMBINED profits before taxation of the George Cohen 600 Group Ltd., for the year ended March 31, 1958, subject to final audit, amounted to £1,813,815 (against £2,336,628 in the previous year.) Provision for taxation based on profits of the year was—profits tax, £202,419 (£194,178); income tax, £794,219 (£1,044,764). Combined profits of the Group after all charges including taxation and interest on unsecured loan stock totalled £817,177 (£1,097,686).

Distribution for the year is—dividend paid on £1.5 mill. 4½% preference stock, less tax, £38,812 (£38,813); dividend paid on £1 mill. 6½% second preference stock, less tax, £37,375 (nil); interim dividend paid on £3.125 mill. ordinary stock at 4.5% actual, less tax £80,859 (3.5% on £2.5 mill., £50,313); proposed final dividend on £3.125 mill. ordinary stock at 7.5% actual, less tax, £134,766 (8.5% £152,735).

Lord Mills, Minister of Power (centre) watches while Sir Harold Smith, Chairman of the Gas Council, sniffs a sample of light distillate after purification from sulphur compounds—one of the lighter incidents during the Minister's recent tour of the Gas Council's Research Station at Solihull. With them is Mr. R. G. Cockerham, organic chemist, and extreme right, Dr. L. A. Moignard.

Richmond Keeps its Gaslight . . .

SOME of the historic roads in Richmond, Surrey, are to retain their gas lighting although the lighting in the remainder of the town's side roads is being converted to electricity.

Roads exempted from the modernisation programme are in the vicinity of Richmond Palace, the parish church, Petersham and parts of Richmond Hill.

William IV and George IV lamp posts on Kew Green are also to be preserved.

. . . but St. Andrews Turns it Out

But in Scotland, St. Andrews Town Council has agreed to convert the street lighting in Market Street to electricity, without attempting to adapt existing gas standards for the purpose.

A request to adapt the gas standards was made on behalf of St. Andrews Preservation Trust, but the South of Scotland Electricity Board pointed out technical difficulties.

It was agreed, however, that a limited number of the old gas standards should be preserved.

W.G.F. MUST WIDEN VISION, PRESIDENT TELLS MEETING

MORE than 500 members, representing 92 of the 135 branches of the Federation attended the recent annual general meeting of the Women's Gas Federation.

The meeting was presided over by Miss K. M. Halpin, C.B.E., President of the Federation, and the platform party included Sir Harold Smith, K.B.E., Chairman of the Gas Council; Sir Henry Jones, M.B.E., Deputy Chairman of the Gas Council, and Lady Jones; Mrs. Patricia McLaughlin, M.P.; Mrs. G. Abbott, Chairman of the Executive Committee; Professor Arthur Newell; Dr. and Mrs. Andrews, of Melbourne; Dame Vera Laughton Mathews, D.B.E., Adviser on Women's Affairs, Gas Council; Sir Ernest Smith, President, National Smoke Abatement Society; Mr. C. H. Chester, C.B.E., Chairman, South Western Gas Board; Mr. Sydney Smith, C.B.E., Chairman, Scottish Gas Board; Sir John Stephenson, C.B.E., Chairman, Eastern Gas Board; Mr. D. P. Welman, Chairman, North Western Gas Board; Miss O. L. Humphries and Miss Ellington Wright, M.B.E., Vice-Presidents of the Federation.

Opportunities

In her address, Miss Halpin said that meetings and conferences at both national and local level provided opportunities for putting ideas and ideals before the public. The Federation must broaden its vision so that the branches were a live forum of intelligent homemakers who realised that gas provided the best and most economical form of fuel in the home.

In conclusion Miss Halpin paid tribute to the work of the retiring Chairman, Mrs. G. Abbott.

Mrs. Abbott moved on behalf of the Executive Committee that Miss Halpin be re-elected President of the Federation, saying that Miss Halpin had given outstanding service and great encouragement to the Federation for many years.

Miss Halpin's election was carried with acclamation.

Caught by the camera outside the gas and coke pavilion at the Royal Show, Bristol, are (left to right), Mr. T. L. Tallentire, Engineer and Manager, Cheltenham/Gloucester Division, South Western Gas Board; Mr. T. W. Jackson, Engineer and Manager, Bristol/Bath Division; Mr. T. N. Dent, Area Development Manager; Mr. W. B. Claridge, Engineer and Manager, Swindon Division; Mr. J. W. Dean, Engineer and Manager, Plymouth/Corwall Division; and Mr. J. D. Butler, Engineer and Manager, Weston/Taunton Division.

N.C.B. Work on Briquettes Advancing at Snail's Pace, Lords Are Told

IN the House of Lords, recently, Lord Hawke asked what progress had been made in the manufacture of briquettes from small coal. He said the figures showed that progress was more that of the snail than of the hare. Moreover, the Coal Board had made a loss on briquettes.

If, he commented, the production of these briquettes resulted in turning coal which was unusable by domestic consumers into something they could burn, it was rather difficult to see how the operation could have been conducted at so large a loss. On the face of it, to turn small coal, which could not be sold, into something which could be substituted for large coal seemed, *prima facie*, an operation which ought to show a profit.

He wondered whether N.C.B. research in this line of country was being given clear directives; whether the lure of smokeless fuel for the future might not be obscuring the need to turn out something for the present which might be non-smokeless but which at the same time was burnable by domestic consumers, thus using a lot of small coal.

If the Board thought this sort of briquette could not be made successfully and that the only research worth doing was for the future, in pursuit of the smokeless fuel, then let them say so. But let them have an objective and be careful that the best was not the enemy of the good.

Lord Amulree said he was filled with alarm that so little progress had been made towards these briquettes and making this form of coal available. If they were to make some parts of the country so-called 'clean air' parts, there must be enough fuel of the right type to burn, so that the air would not get polluted with the coal, as it was at the moment. He hoped the Government would regard this as a matter of very considerable urgency.

Replying for the Government, Lord Chesham said that the eye of the N.C.B. was turned to the future. They were producing all that they could sell from their present plant, and further developments which would cost a great deal more money were rather inhibited by the doubtful future for a smoky briquette in view of the Clean Air Act and what people prefer.

The real problem with which the Board was faced was, therefore, to find a commercial process for making smokeless briquettes from suitable kinds of smoky small coals which were in good supply, rather than using the scarcer, naturally smokeless coals or carbonisation coals. The Board's aim was to produce from smoky small coals a superior type of smokeless briquette which would burn well, be easy to light in open grates, and, above all, be reasonably priced.

There were various processes being investigated towards this end, and they were in or approaching the pilot plant stage. The most promising development in this field was one for making briquettes from small coal which underwent a heat treatment process so as to drive off the smoky substances, and was briquetted while still hot.

ATOMIC ENERGY STATION COOKS BY GAS

A NEW gas consumer came into being recently at the United Kingdom Atomic Energy research station at Winfrith Heath when a canteen was opened in a temporary building. It caters for about 1,200 building staff and will remain until the building programme is completed.

All gas service and installation work inside the establishment was carried out by Matthew Hall & Co., Ltd.; of London.

When they were ready to receive gas Southern Gas Board distribution engineers and fitters purged and checked the whole of the system and connected the gas to the Board's integration main during part of a morning. Fitters were standing by the appliances in the canteen to make final adjustments when the gas came through and had everything working at 11 a.m.

Equipment installed in the canteen includes appliances by Benham and Stills.

Eventually a new main canteen will be built for the A.E.R.E. staff and will cater for approximately 2,000. It will operate 24 hours a day.

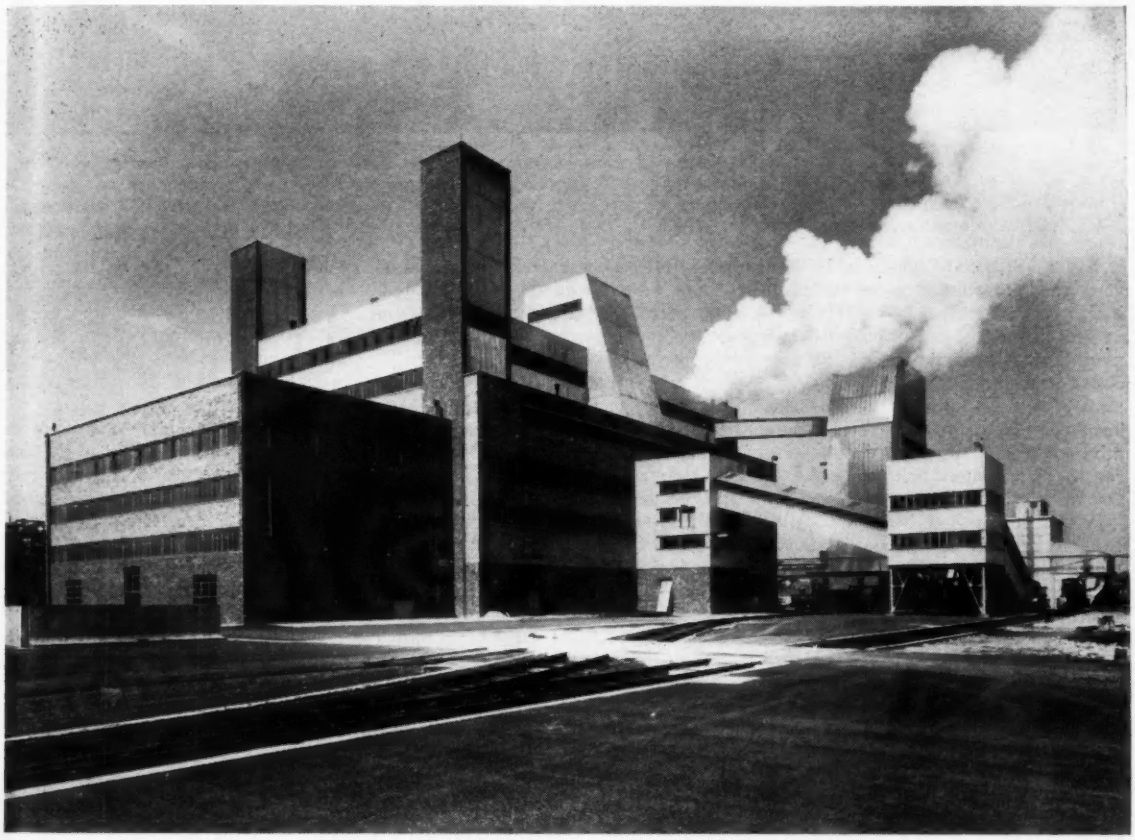
Sc.G.B. Lurgi Plant

By the middle of 1960 it is expected that enough gas for the whole of Fife will be produced by the Scottish Gas Board's Lurgi plant at Westfield, near Loch Leven. By 1962 the plant will meet the requirements of Angus, Perthshire, Fife, Clackmannanshire and Stirling, with a surplus to feed into the Glasgow system.

Members of the Works and Development Panel of the Coal Tar Research Association recently visited the Thorncliffe works of Newton Chambers and Co., Ltd., near Sheffield. The Association was responsible for the research work which produced the process for the hydro-refining of crude benzoles and naphthas which is now being operated in a pilot plant at Thorncliffe, and which the visitors inspected. Pictured here during the visit are, back row (left to right): Mr. G. N. Rodgers, Assistant Company Secretary, Newton Chambers and Co., Ltd.; Mr. F. M.Potter, Scottish Tar Distillers, Ltd.; Mr. W. A. Weeks, Lancashire Tar Distillers, Ltd.; Dr. D. McNeil, Director, C.T.R.A.; Mr. R. F. Twist, South Eastern Gas Board; Mr. K. E. Walker, Director, Newton Chambers and Co., Ltd.; Mr. A. L. Curtin, United Coke and Chemicals Co., Ltd.; Mr. J. B. Vickers, Yorkshire Tar Distillers, Ltd.; Mr. D. R. Kernon, Bristol and West Tar Distillers, Ltd.; Front row (left to right): Mr. G. Polglaze, South Western Tar Distilleries; Mr. D. E. Cunningworth, National Coal Board; Mr. L. W. Blundell, C.T.R.A. Chairman, North Thames Board; Mr. P. J. C. Bovill, Managing Director, Newton Chambers and Co., Ltd.; Mr. W. E. Aylwin, The Midland Tar Distillers, Ltd.; Mr. F. Nisbet, Burt, Boulton and Haywood, Ltd.; Mr. G. H. Thompson, Secretary of the C.T.R.A. Works and Development Panel.

WHITE LUND OPENS

Latest of the Traditional Coal Carbonisation Plants



View of the chamber house and coke screening plant.

A NEW £2 mill. gas production station at White Lund, near Morecambe, built by the North Western Gas Board to replace seven works at Lancaster, Morecambe, Carnforth, Bentham, Ingleton, Kirkby Lonsdale, and Sedbergh, was opened by Sir Ian Horobin, Parliamentary Secretary to the Ministry of Power, on July 25.

A hundred guests, representing the communities served and the gas supply and gas engineering industries, attended the ceremony. They included Sir Harold Smith, K.B.E., Chairman of the Gas Council, the Mayors of Lancaster and Morecambe, and representatives of other civic authorities in the surrounding districts. They were welcomed by Mr. D. P. Welman, Chairman of the North Western Gas Board, Mr. W. Hodkinson, O.B.E., Deputy Chairman, and the other Board Members.

Speaking after a tour of the works, Sir Ian said: 'Although I have seen bigger works, I have not encountered any more efficiently planned, White Lund is a rather good example of the way town gas is being increasingly produced now in this country so as to keep costs down to a minimum and provide a better service to the consumer.'

Sir Ian recalled that a week earlier he had paid a 'most useful and informative visit to the Midlands Research Centre of the Gas Council at Solihull.' If the research work he had seen there was successful it would mean that the industry would be able to use a kind of coal now and prospectively in easier supply to the benefit of the nation and the gas consumer.

Carbonisation coal was becoming scarce and dear and the industry's future success would depend on its ability to utilise by new methods the cheapest kind of coal. But until these new processes were proven, the industry would have to continue to rely on operating existing carbonisation techniques with the greatest possible efficiency.

The gas industry had achieved much in this regard in recent years. The new White Lund station with its waste heat recovery and other devices, was designed to extract the maximum from the coal it carbonised.

Seen touring White Lund works on the occasion of the opening are, left to right, Mr. Andrew Wilson, Regional Director, Ministry of Power; Mr. F. C. Buckley, Northern Group Assistant Production Engineer, who acted as guide; Sir Harold Smith, Chairman of the Gas Council; Sir Ian Horobin; Mr. D. P. Welman, North Western Board Chairman; Mr. H. D. Robinson, Group General Manager; and Mr. P. H. J. Price, Northern Group Production Engineer.

It had an efficiency of about 80%, a very great improvement on the plant it was replacing.

The closure of inefficient obsolete plant and the concentration of production in large efficient works was making a great contribution towards keeping manufacturing costs to a minimum, and was one justification for the large sums being invested in the industry.

Earlier, there had been a tour of the works and a luncheon at the works when Mr. D. P. Welman, Chairman of the North Western Gas Board, welcomed Sir Ian and the other guests. He specially commended the work done in connection with the new works by Mr. P. H. J. Price, Group Production Engineer.

Sir Harold Smith said there was a possibility that not many more plants of this kind would be commissioned. The industry was entering a new era when new processes of manufacture were being conceived.

It was interesting to note that the North Western Board should have what might be described as the newest of the old plants and also the first of the very new plants going into commission at Partington. It was encouraging to see that the well known contractors to the gas industry had confidence in the new gas processes—Woodall Duckham and Humphreys and Glasgow were both represented on the White Lund site, for example.

The proceedings closed with an address by the Mayors of Morecambe and Heysham, and of Lancaster.

The commissioning of the new works has made possible the closing down of both Lancaster and Morecambe stations. In fact, so great was the North Western Gas Board's confidence in its success that both ceased production within 24 hours of the commissioning of White Lund.

The works are on a derelict site forming part of a trading estate being developed by the local authority. After clearance it offered all the advantages of a 'green field' site, allowing ample room for coal and coke stocking, the installation of mechanical handling equipment, and advantageous layout of plant.

White Lund works is the largest gas production plant in the North Western Gas Board's Northern Group which was formed by the amalgamation of the three groups constituted on nationalisation; Lancaster—Morecambe, Furness, and Kendal.

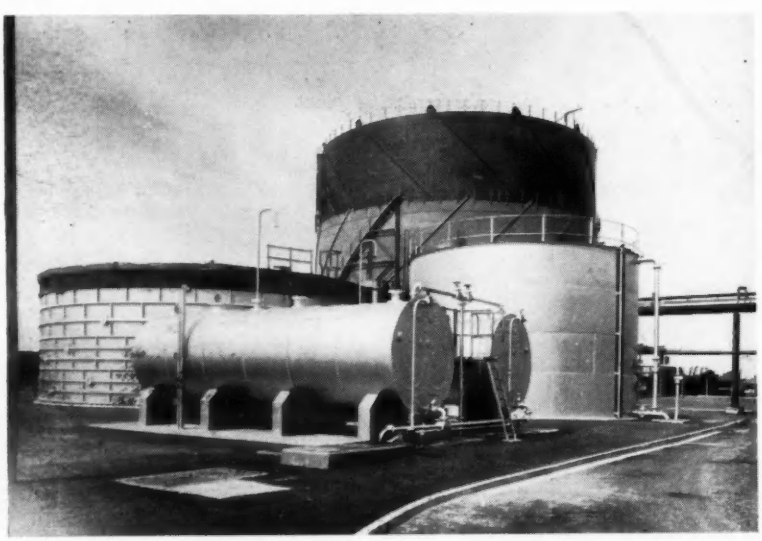
Compared with the other groups in the North Western Board's area, the Northern is the most difficult to integrate into a comprehensive grid system supplied by gas produced in centralised works.

The old Furness Group has been centred on the gasworks at Barrow-in-Furness and forms a completely integrated unit, controlled from a centralised control room in Barrow. It employs an A.T.M. telemetering system by which all information is passed automatically from outlying unmanned holder stations to the control centre.

The flow of gas and the running of compressors at the distant stations may also be controlled from the Barrow centre.

The old Kendal Group consisted of a number of very small undertakings with an output of 152 mill. cu.ft. a year in addition to Kendal itself with an output of 196 mill. cu.ft.

In the old Lancaster—Morecambe Group, there were four undertakings



A group of storage tanks at the south-western extremity of the works. On the extreme left is the crude liquor storage tank, to its right is the tar storage tank, while the two horizontal tanks in front are the effluent balancing tanks. The works' production or intermediate storage gasholder is seen in the background

outside the two chief towns, with a total output of only 59 mill. cu.ft. a year.

Integration has gone forward as quickly as possible and now the whole of the Lancaster—Morecambe section has been inter-connected by a grid supply system which also takes in Sedbergh from the Kendal section. So far the only linking that has been possible in that section is between Windermere and Ambleside, and Kendal and Staveley. It is hoped to link up the whole of it by stages to White Lund and to reduce the number of production stations in the whole Group to two. Such an arrangement can be seen on p. 223. Production will then be confined to Barrow and White Lund.

Although this is the background to the building of the White Lund works, plans for building a plant on this site were conceived before nationalisation. The Lancaster undertaking had applied to the Ministry of Fuel and Power to rebuild its carbonising plant as long ago as 1946. About the same time the Morecambe undertaking had sought permission to build a new gasholder and a new water gas plant.

The Ministry decided, however, that any question of new plant must be considered by a joint gas committee from the two Corporations.

After considering a number of sites the White Lund site was chosen in 1947.

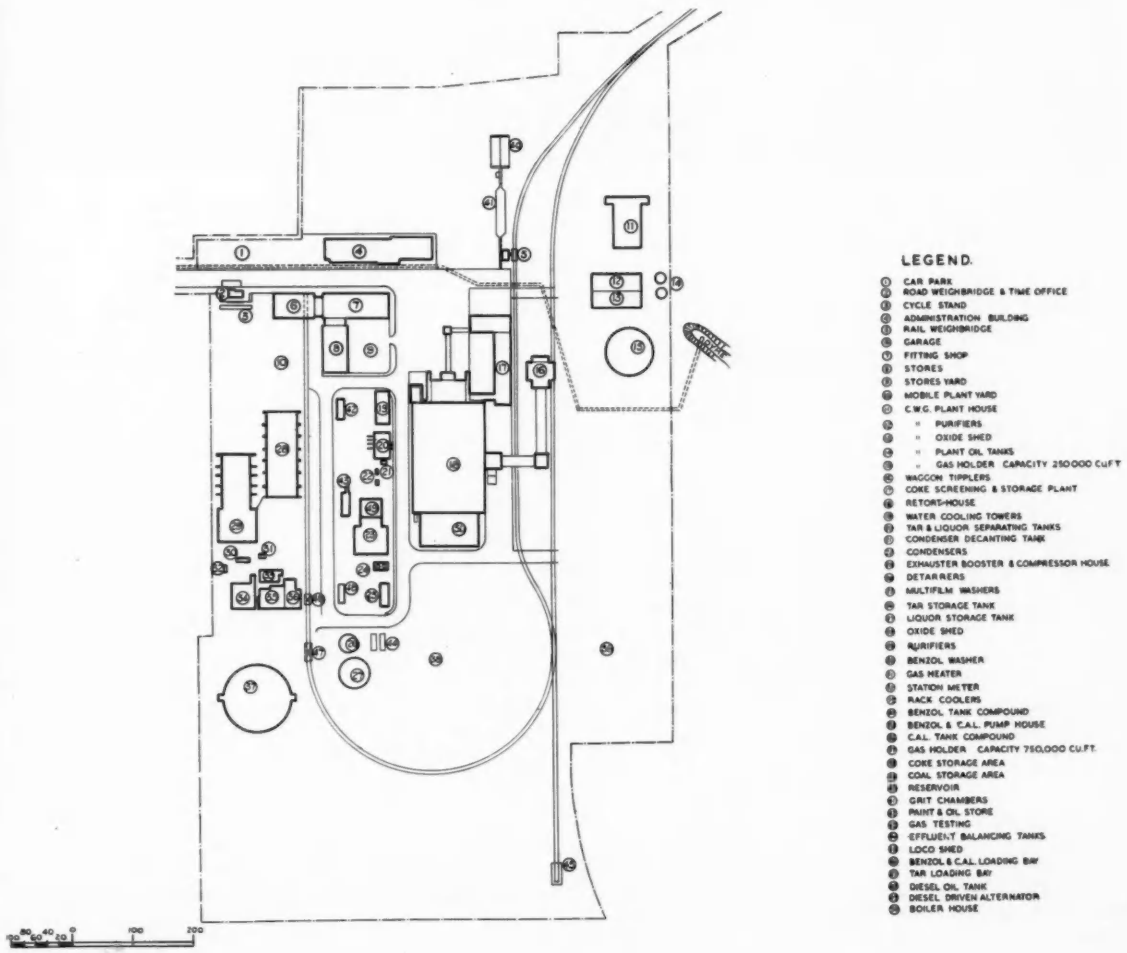
On further investigation, the site that had been chosen at White Lund proved to be unsuitable. It had been used for a number of years as a refuse tip and temperature observations at various depths showed that combustion was still going on. By arrangement with the Lancaster and Morecambe Corporations and some private owners of other sites on the White Lund Trading Estate, an adjacent site was acquired by the North Western Gas Board and preparations were made for the building of the new works.

The site chosen for the new works had formed part of the National shell-filling factory built during World War I and destroyed by an explosion in 1917. Since then, it had lain derelict, and had had to be cleared of all old ruined buildings and foundations.

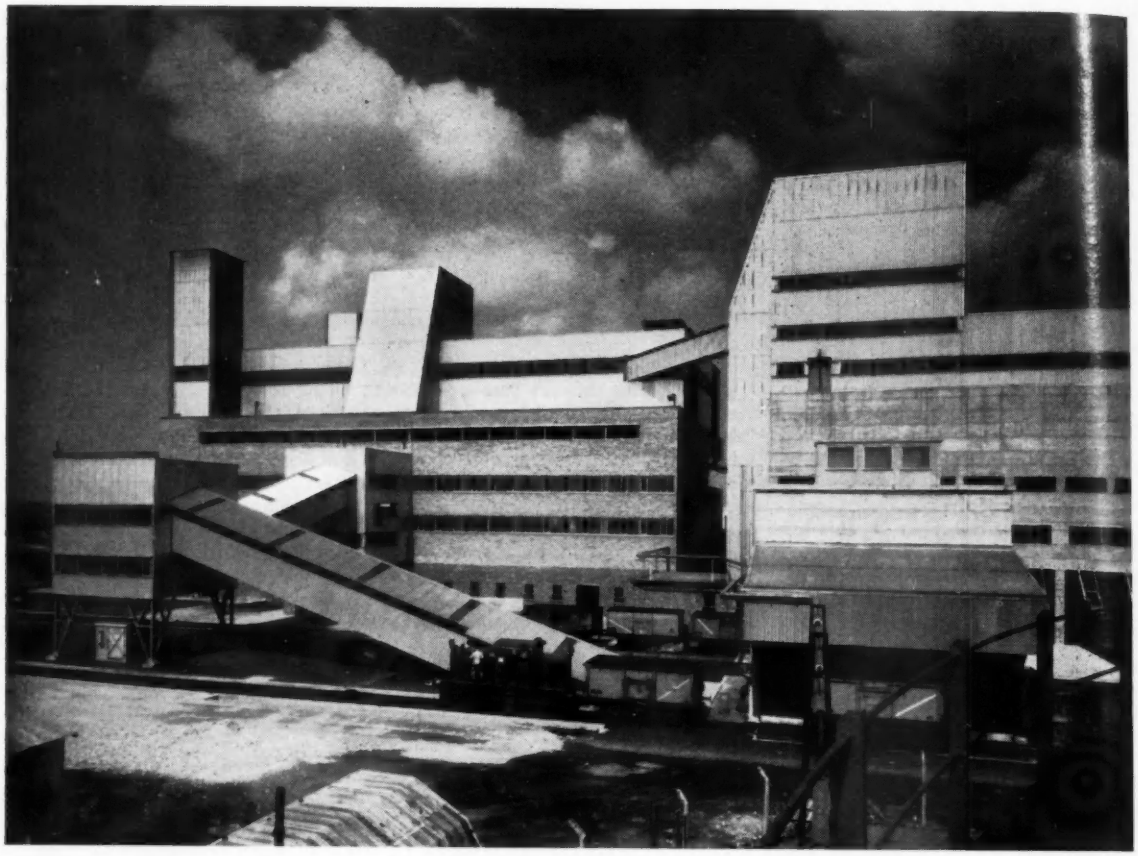
To avoid the possibility of flooding it was decided to raise the level of the cleared site from 16 ft. O.D. to 20 ft. O.D. by the tipping of 4 ft. of filling, allowing for a 6 in. natural fall for drainage. The Board were fortunate in being able to obtain a very high quality quarry spoil for the cost of carting from a quarry in the neighbourhood.

This formed a good general foundation for the site, which reduced piling to a minimum and did away with any need for hard core when the main roads throughout the works were being laid. The work of site preparation was carried out by Harbour and General Works, Ltd. The final site has an area of 24.9 acres.

The railway sidings of 7.9 acres were laid out adjacent to the main



Layout of works.



A general view of the chamber house with the coke screening plant on the right. The gangway linking these, seen in the centre of the picture, enables men to pass between the chamber house bunkers and the coke plant without first descending to ground level. The wagon tippler may be seen in the right foreground with a wagon about to tip.

works site parallel to the electrified railway line running between Lancaster and Heysham. On these sidings 50 full and 50 empty wagons can be accommodated with ample room for shunting operations.

The drainage of the main site is by covered water surface channels which transport all surface water to a specially designed flume consisting of four parallel channels leading into an 80,000 gal. reservoir. As the water enters the flume, its velocity is reduced to a constant flow speed, which allows it to be metered and as much as possible of the heavy grit contained in it to settle before entering the reservoir.

This particular arrangement was specially suitable since the ground consisted of 12 ft. of alluvium which would have to be excavated before any foundations would be possible.

By only having to excavate to this depth, 12 ft., for this type of grit settling plant, the expense which would have been incurred for the extra excavation needed for an ordinary sedimentation plant was avoided. During the preparation of the site a dyke running across it was encased in a concrete box culvert, 5 ft. by 4 ft., through which drainage water from other parts of the estate flows away in a southerly direction towards the river Lune.

Piling was necessary for certain of the plant foundations. The piles used were 12 in. sq., precast, to B.S. Specification and varying in length between 18 and 21 ft. They were cast locally by Harbour and General Works, Ltd. The number of piles driven in each case were about 540 for the carbonising plant, about 70 for the coke screening plant, 65 for the machine house, 313 for the gasholder and 155 for the purifier plant.

The Woodall-Duckham Construction Co., Ltd., are the main contractors for the coal handling, carbonisation and coke handling plants. Coal is delivered from the works sidings, either to the stocking ground which will hold some 17,500 tons or to the coal tipplers. Wagons tip in a closed structure to prevent dust nuisance. Here it is discharged by a 25-ton electrically operated 'rotaside' wagon tippler by Strachan and Henshaw, incorporating an Avery weighbridge, into a 50-ton capacity receiving hopper. At the two bottom outlets, Locker-Trayler vibrating feeders deliver it on to duplicate conveyor systems each capable of handling 100 tons of coal per hour. The coal is crushed to a maximum of 1½ in. cube in British Jeffrey Diamond coal breakers, which can be by-passed by means of hinged bar screens fitted with chutes, if desired, and then delivered by bucket elevators and belt conveyors to the overhead coal storage bunkers arranged above the benches. These bunkers have a capacity of 1,350 tons and are fed by shuttle conveyors. There are additional stand-by facilities for handling road-borne coal, which is received in a 7-ton capacity hopper and delivered by conveyor to the bucket elevators. Coal is recovered from stock by loading into road wagons by mechanical shovels and tipping into this 7-ton hopper.

The carbonising plant consists of three benches, each of three settings of fully recuperative Woodall-Duckham intermittent vertical chambers. Each setting, consisting of six chambers, is separated from its neigh-

bour by an air cooled partition wall and can be operated as a separate unit, by the provision of its own step grate producer and counterflow recuperator. There are, therefore, a total of 54 chambers. Provision has been made for the installation of a fourth bench at some future date so that eventually there will be two lines of two benches. The carbonising plant as it stands has a guaranteed throughput of 418.5 tons of washed Yorkshire singles per day and a gas production of 6.78 mill. cu.ft. per day at a calorific value of 475 B.t.u. per cu.ft., allowing for producer gas dilution and without benzole extraction. This is equivalent to a yield of 76.83 therms per ton.

In order to reduce the organic sulphur of the gas distributed in the district as much as possible, the maximum amount of oil washing for benzole is practised. At an extraction rate of 3 gal. per ton, the total possible gas production will be reduced to 6.24 mill. cu.ft. per day. In actual practice the extraction rate is somewhat higher at 3.1 gal. per ton which reduces the organic sulphur content of the gas distributed in the district to 8.2 grains per 100 cu.ft. Since the Northern Group is a coke importing area, any extra coal that may have to be carbonised to make good the losses from high benzole extraction does not embarrass the coke stocking position and any extra coke made is easily sold.

Type of Coal in Use

At present, in place of Yorkshire singles, Newmarket coal is being carbonised. When this type of coal is carbonised, the yield of coal gas is somewhat lower. Experience shows that a yield of 68 therms per ton without benzole extraction, and 63 therms per ton with benzole extraction can be achieved. This reduces the potential output of the plant as follows: The make of rich coal gas at a calorific value of 550 B.t.u. per cu.ft. after the removal of 3.1 gal. per ton of benzole and dilution with producer gas to a calorific value of 475 B.t.u. per cu.ft. is equivalent to a yield of about 13,250 cu.ft. per ton of coal carbonised or 5.6 mill cu.ft. per day. It was with this particular daily make in mind that the capacity of the ancillary plant was designed.

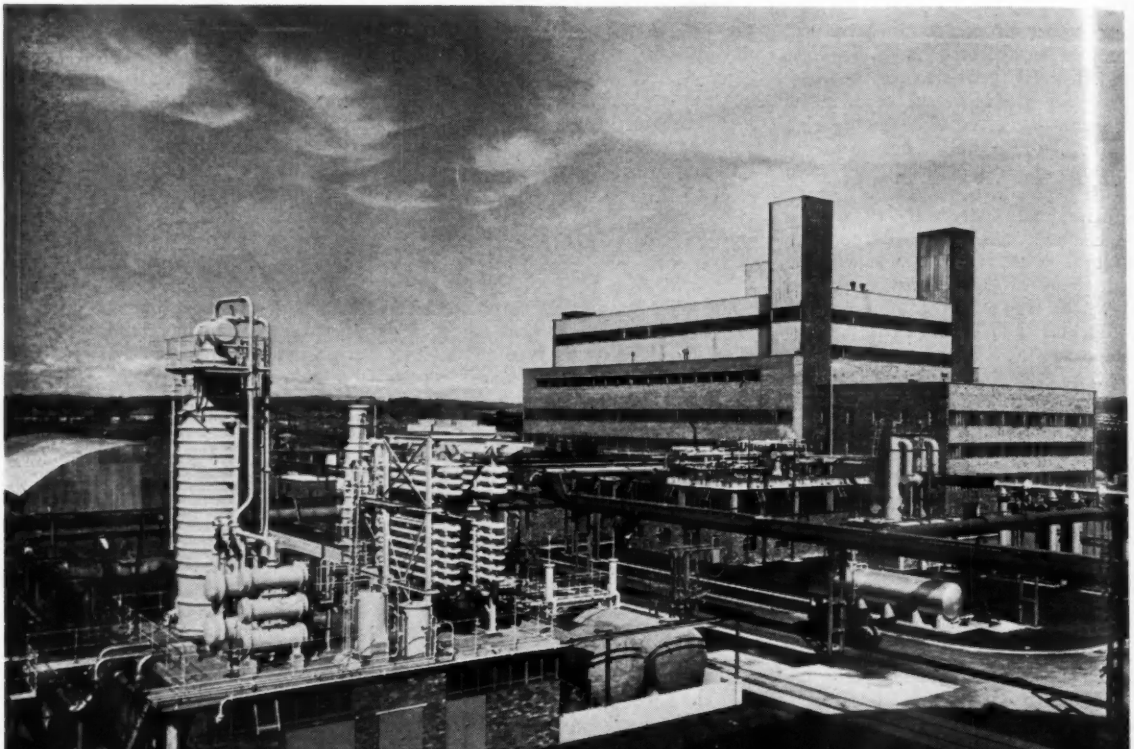
In its design the possibility of the building of the fourth bench was also taken into account. When this happens it will be necessary to increase its capacity, and it was calculated that by doubling the present capacity, i.e., by installing a duplicate set of units, the full potential capacity of the carbonising plant would be met.

The chamber house is a very attractively designed steel framed building, brick clad in two contrasting colours of Ravenhead rustic bricks, while the top part housing the coal and coke bunkers is clad in unpainted aluminium sheeting.

This combination of cladding materials has a most pleasing effect. The coke screening plant which stands near to the chamber house has its screening section clad with unpainted aluminium sheets which are in striking contrast to the concrete of the coke storage bunkers.

All conveyor gantries and the tippler house are similarly clad with aluminium sheets. The design of the chamber house was the result of close co-operation between the North

Map of the North Western Gas Board's Northern Group.



A general view of the works from the south-west showing the chamber house, the machine house and ancillary plant on the right. On the left is seen the benzole recovery plant with the C.A.L. concentrated ammonia plant next to it. The roof of the oxide shed is seen in the background.

Western Gas Board, the Local Planning Authority and the Fine Arts Commission.

If the future demands for gas show a marked increase there is enough room on the site for duplicating the chamber house, the coal and coke handling plants and ancillary plant.

From the storage bunkers, which have a capacity of 72 hours coal requirements, the coal is fed into the chambers by top-hung electrically propelled charging cars, of which there are two, one serving each line of benches. A third hand-propelled car acts as a standby. Each charging car is provided with separate compartments for coal and coke, the latter supplying the small coke (No. 4) required for the protective pad on the chamber bottoms. Sealing hoods attached to the feeding chutes and travelling fume extraction hoods over the gas offtakes reduce dust and smoke nuisance to a minimum during charging operations.

These are fitted to No. 1 and 3 benches. Twin cyclone dust extractors remove grit from the smoke-air mixture, which is exhausted by an electrically driven fan capable of passing 10,000 cu.ft. per minute.

The chambers are rectangular in plan and about 21½ ft. high, with a major axis of 10 ft., and a minor axis of 8½ in. at the top and 12½ in. at the bottom. The tapering width, increasing evenly from top to bottom, is to ensure unaided discharge of the coke when carbonisation is complete. Each chamber with a capacity of approximately 3¾ tons of coal, is charged and discharged at intervals of approximately 12 hours, giving a maximum daily capacity of 418.5 tons and can produce a maximum of 6.78 mill. cu.ft. of gas daily by dilution with producer gas. The walls and heating flues are constructed of silica and finished at the top and bottom with courses of fireclay bricks. There are three circular charging holes with door frames embedded in fireclay and fitted with self sealing doors. The chambers which are fitted with top and bottom gas offtake pipes, and a scurfing hole and lid, are carried on seating castings, supported on deep joists at about 10½ ft. from ground level. Arrangements are made for the admission of steam for water gas production during the latter part of the carbonising cycle. A special feature of the bracing of the settings is the use of water cooled tie rods through which water flows to the boiler feed water tank.

The lambent heating system is employed. Hot producer gas is generated in step grate producers, which with the recuperators rise from ground level to the full height of the setting. The recuperators, constructed on the counterflow system, are built in two halves, on either side of each producer. Dampers are provided for partially by-passing each recuperator in order to raise the temperature of the waste gases and increase the steam output of the waste heat boilers when required.

As the secondary air travels upwards through the recuperator, it is pre-heated by the waste gases passing downwards through adjacent flues. It is then admitted to the heating flues at the point where the producer gas enters the combustion zone passing upwards and at the same time transversely from end to end of the chamber. There is a common combustion chamber between each carbonising chamber and one at either end of

each setting. Additional secondary air is admitted at two higher levels as required. The temperature of the gases remains constant from end to end of each horizontal flue, although there is a temperature gradation from top to bottom of the setting which counterbalances the taper in the carbonising chamber and ensures that all parts of the charge are uniformly carbonised in the same time.

The temperature at the bottom pass is at present at about 1,275°C. and at 980°C. at the top pass. The producers are unusual in that the primary air instead of being induced by steam venturi, is compressed to 2½ in. w.g. by individual air blowers. This allows a better control of the air quantity and the use of low pressure exhaust steam for saturating the air blast. Experiments are being undertaken for the substitution of water for steam to economise in its use for minimising clinker formation. The charging of the producers is carried out by electrically propelled charging skips, holding approximately 1 ton of coke, and running on a monorail above the line of benches.

Coke is received from the overhead bunker, weighed by one of three Avery overhead weighers and totalisers (one for each bench) and transported to the producer to be charged. This includes the charging of the diluent gas producers.

The gas diluent plant consists of three step grate producers with a total capacity of 1.695 mill. cu.ft. per day of gas of a calorific value of 125 B.t.u. These producers are similar in size to the setting producers but differ from them in that primary air is induced by steam venturis. Sufficient diluent gas can be provided by two producers for coal gas dilution to 475 B.t.u. per cu.ft. but all three will be needed for a dilution to 450 B.t.u. per cu.ft. The hot gas generated travels from the back of the dilution producers, through brick ducts containing flow control isolating dampers into a refractory lined steel producer gas main to a gas washer and cooler. The main is provided with a series of dust pockets from which any deposited dust carried over from the producers can be removed by means of dust drop valves.

The gas washer, which contains coke between 1 in. and 1½ in., sprayed with water, removes any dust remaining and cools the gas. The washer is of steel and cast iron construction 8 ft. high by 3 ft. 9 in. internal diameter. The clean cool gas leaving the washer passes into a cast iron seal tank fitted with a sight flow and an adjustable overflow. From here the gas passes through an 18 in. main to join the coal gas from the chambers before it enters the condensers.

To maintain the correct proportioning of producer and coal gases an electric motor-operated butterfly valve is provided in the clean producer gas main. The motor is remote controlled by push buttons installed in the calorimeter room. An Askania regulator controls the pressure of the steam for the producer air inlet venturis. This regulator is controlled by the pressure of the gas in the hot producer gas main.

When carbonisation is complete the bottom door of the chamber is opened and the coke is discharged into a large skip or coke car big enough to hold all the coke from one chamber, 2.9 tons. One skip is provided for each line of benches and runs on rails laid beneath the settings.

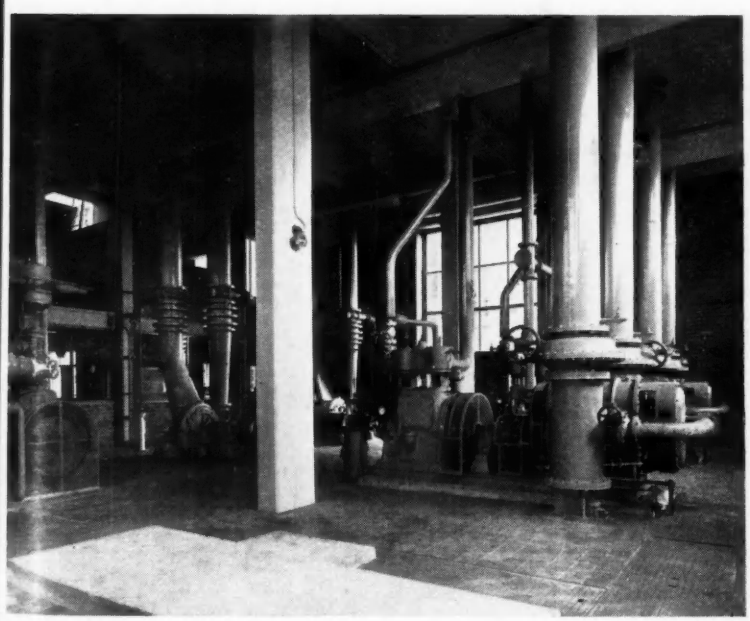
It is hauled by an electrically driven chain haulage gear to the quenching towers which are also duplicated. The bottom door of each chamber is hydraulically operated and is carried at eight points by four double hinges which are keyed to the main shaft. Double acting hydraulic rams provided for each setting are controlled by a four-way valve and operate a series of racks which extend the length of the settings. Each door is fitted with a pinion wheel and clutch at the end of the main shaft which can be engaged by the insertion of a pin and the action of a hand lever through a shaft running parallel to the rack. The latch shaft is fitted with a hand lever and opens all latches simultaneously. The rack can then be moved by hydraulic power by the operation of a lever on the hydraulic valve box and the door opened or closed. (The provision of a single pin ensures that only one door can be opened at a time.)

Two Methods

To scurf the chambers, two methods are regularly employed. The one, intermittent, is to leave the chamber open for one complete cycle when the top and bottom firebrick is given a refractory washing. This is carried out every three weeks. The other is continuous scurfing when the chamber is scurfed between discharging and recharging; it remains open for 36 minutes.

The gas collecting system is designed to ensure efficient spraying of the gas with hot ammoniacal liquor and the ready removal of heavy deposits from the collecting mains. Each chamber is provided with two gas offtake pipes, one at the top and one at the bottom, the latter to function during the early stages of carbonisation when gas evolution is exceptionally rapid. For each bench there are three collecting mains, one upper and two lower, the former provided with hot ammoniacal liquor sprays and the latter with facilities for draining tar and liquor deposits. Vertical gas uptakes and liquor downtakes connect the top and bottom mains.

The top off-takes are fitted with liquor sealed dish valves which enable



The interior of the machine house showing the two Waller exhausters on the right, the two gas boosters in the left background, and the steam driven compressor on the extreme left.

any individual chamber to be isolated from the collecting main while it is being discharged. The bottom off-take comes into operation automatically by means of a dip-pipe if the gas pressure at this point of the chamber becomes excessive. The vertical up-takes connecting the top and bottom mains are fitted with hand-operated butterfly valves which can be set to give a slight pressure on the bottom off-take main. From the top collecting main the gas passes to the foul mains and so to the ancillary plant. The charge of coal in the chamber is steamed towards the end of the carbonising cycle, generally after the seventh or eighth hour.

For this purpose a low pressure superheated steam supply is connected to the base of the chambers. Before steaming, the butterfly valve in the bottom off-take must be closed.

Each bench is provided with its own retort house governor with bypass, and consists of a butterfly valve operated by a linkage through a Kent Mark 4 power cylinder. This power cylinder is designed to operate in the Kent Mark 20 compressed air-powered control system incorporated in the Kent furnace pressure controller. A small electric compressor and reservoir tank supply the compressed air for its operation.

The liquor and any tar which is deposited in the top collecting mains passes through the three downtakes into the bottom collecting mains, each of which is divided into two separate compartments and fitted with a cleaning sump.

The decanted liquor, together with make up liquor from the condensers passes into a separate clean liquor compartment of the separating tank (1,100 gal. capacity) from which it is pumped back to the sprays in the top collecting main and off takes. Each line of two benches has two 11,000 gal. per hour centrifugal pumps, one driven by a steam engine and the other by a direct coupled electric motor, the former pump acting as a standby. In this manner a closed ammoniacal liquor circuit is provided and a regular supply of hot liquor is ensured. The separating tanks and spray systems are interconnected so that, in an emergency, or when one tank is being cleaned, the other tank can serve both benches. A further safeguard is provided in the clean liquor compartment of the tanks where a predetermined drop in level of liquor will bring into action an emergency town water supply operated by an equilibrium float valve.

To make up for the loss of spray liquor by evaporation and also to counteract the tendency of the circulating liquor to concentrate, liquor from the condensers is pumped into the main separating compartment of the tank which is fitted with an internal 6 in. overflow; the decanted liquor section also contains a visible sight overflow. Both of these overflows pass into a common draining main which eads into the main works separator.

The temperature of the liquor to the sprays should never be allowed to fall below 60°C. and steam is provided to heat the liquor if it should drop below this figure. Care must be taken to see that the liquor is not becoming over concentrated or the deposition of the chloride salt may take place

A Wadsworth lift provides easy access between the different levels in the interior of the chamber house.

The waste heat boiler installation included in the chamber house consists of three Woodall-Duckham horizontal, induced draught, fire tube, boilers designed to raise 7,700 lb. of steam per hour at 190 lb. per sq. in. Each can deal with the gases from two benches, leaving the third as a standby to the other two.

Induced draught is by means of Davidson 'sirocco' fans driven by Bellis and Morcom steam engines, which will deal with up to 30% overload. High pressure superheaters arranged in the inlet flues of the boilers raise the steam temperature to 550°F.

The waste heat boilers which are installed in a separate section of the chamber house are connected to the benches by a circular steel waste gas main lined with insulating firebrick. Into this main waste gases from the two lines of benches are fed from the recuperators by two bricklined steel mains, one for each line of benches, but these gases may be passed direct in two clumneys in case of emergency. Each clumney is of steel construction lined with fire brick and of ample size for the efficient working of two benches of 36 chambers.

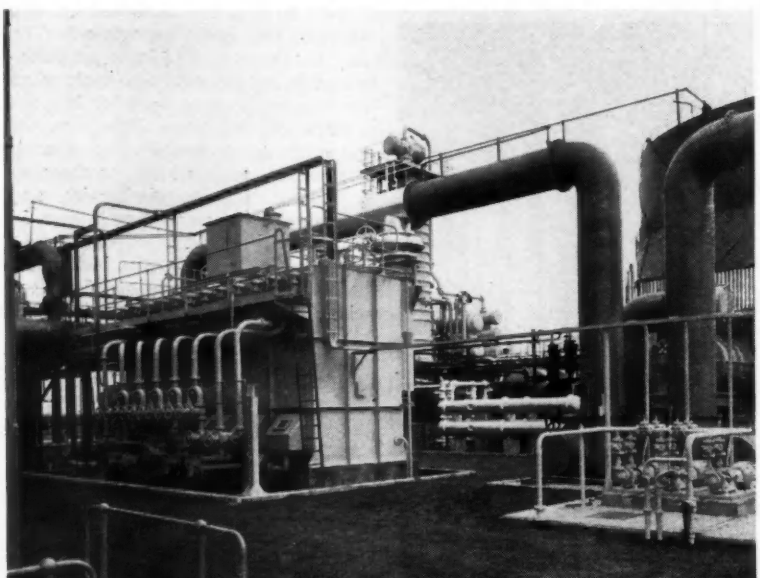
Augmenting Steam Supply

To augment the steam supply, two solid fuel fired Economic type boilers by Edwin Danks have been installed in a boiler house adjacent to the annexe of the chamber house but separated from it by a partition wall. Each has a capacity of 4,000 lb. of steam per hour at 190 lb. per sq. in. at 550°F. burning breeze of 0-$\frac{1}{8}$ in. and is equipped with induced and forced draught fans and grit arrestors.

Boiler feed water is supplied by two vertical, single cylinder direct acting feeds pumps, one standby, by G. & J. Weir Ltd. Each pump drives its own chemical injection pump from a special crosshead. All exhaust steam from the pumps passes through a heating coil in the feed water storage tank before passing to atmosphere.

A Weir de-aerating plant reduces the oxygen content of the feed water to .025 c.c. per litre, and this is constantly measured and recorded by a dissolved oxygen recorder by the Cambridge Instrument Co., Ltd.

The plant which has a capacity of 18,000 lb. of water per hour, simultaneously raises the temperature of the feed water received at 120°F. from the



The benzole washer, with the benzole condenser column seen in the background. The station meter can just be seen on the extreme right of the picture.

water cooled tie-rods in the chamber house to 200°F. A chemical mixing tank of 500 gal. capacity is included in the installation.

The waste heat boiler plant is equipped with the usual ancillaries including the thermofeed automatic boiler feed system, and a 'hilo' water level alarm. The steam supply system at this works is very comprehensive. Superheated and saturated steam are available at high and low pressures. Since there are no electric turbo-generators, all steam raised is used for individual prime movers, electric power for works' use being purchased from the public grid supply, with an emergency diesel driven generator installed as a standby. High pressure superheated steam is used to drive the waste heat boiler fan engines, the exhausters and the steam driven booster and compressor. A separate line drives the liquor pump for Nos. 1 and 3 chamber benches. To provide continuity of operation in case of repairs or maintenance to this steam main, a second steam line forming a ring main runs from the boiler house to the machine or exhauster house. Steam from the high pressure line passes through a Gordon de-superheater, which lowers its temperature to 400°F. This saturated steam drives the tie-rod cooling pump, liquor pump and boiler feed pump. It is also the source of steam supply to the de-aerator and the reducing valve for low pressure steam. Its pressure is further reduced to 125 lb. per sq. in. to supply the water gas plant.

Guarding Against Failure

The Gordon de-superheater is provided with a by-pass so that in event of failure, high temperature steam may be used to ensure continuity of operation. Saturated high pressure steam also passes to a Hopkinson-Carlsted regulator where its pressure is reduced to 15 lb. per sq. in. and provides steam for the producer grates, the tar pump jackets, the detarrers, the concentrated ammonia plant, the benzole plant and other low pressure uses. All steam exhausts except that from the boiler feed water pumps are collected and after de-oiling in 'dual oil' separators, pass into this low pressure main.

Steam from the low pressure saturated steam main also passes to low pressure superheaters from which the supply for steaming the chamber charges is taken.

Throughout the chamber house, the standard of instrumentation is very high. Either indicators or recorders as circumstances demand have been installed at important points. A number of instruments supplied by George Kent, Ltd., are locally mounted and cover such uses as measurement of the flow of steam to the base of the chambers, and the flow of steam and air to the producer grates. Temperature indicators supplied by the Cambridge Instrument Co., Ltd., measure the gas temperature at the outlet of the chamber house governor, and the producer air blast.

The interior of the chamber house at charging floor level, showing the tops of the chambers, the gas offtakes and the movable hoods, one to each section of six chambers, for placing over the off-takes while charging.

In the waste heat boiler annexe there is an instrument panel on which are mounted all instruments concerned with steam raising. These include steam pressure recorders for high and low pressure steam, and indicating steam flow and integrating meters, both for the waste heat boilers and solid fuel boilers. Included too are recorders for the temperature of the waste gases entering and leaving the waste heat boilers.

Throughout the chamber house, too, Tannoy loud speakers have been installed by means of which the top and bottom men may communicate with each other and the foreman may be informed of any emergency. The foreman can also communicate with the machine house attendant. The electrical installation for power and lighting throughout the chamber house has been carried out by W. H. Smith & Co. (Electrical Engineers), Ltd.

The hot coke from chambers leaves the chamber house in the skip or coke car and is taken to the quenching towers.

Here a predetermined quantity of water is sprayed on to it from a series of overhead water sprays. The steam rises in the tower, where it is further sprayed by another bank of sprays to eliminate any dust particles which have been carried forward, and escapes to atmosphere above the roof.

Electrically driven centrifugal recirculating pumps supply the quenching water by way of two balancing tanks each holding 2,400 gal. to the towers which are fitted with special louvres to lessen acid dew formation and to help reduce grit emission. After quenching, the coke is run out to the wharf where it is tipped. The tipping of the coke car is hydraulically operated by attaching to it a flexible hose from a stand pipe connected to a cabinet on the coke wharf top, containing an oil reservoir, and an electrically driven oil pump.

After tipping, the coke packs against the finger gates on the wharf, which are used to control the flow on to a band conveyor. From here the coke, after transferring to a second band conveyor passes into a buffer hopper feeding the Jenkins skip-hoist system to the coke grading plant.

At the bottom of the buffer hopper there are two outlets with hinged chutes fitted with automatic cut-off gates. These chutes feed the coke into the twin skip hoist, the automatic gates being actuated by the movement of the skip itself so that it is impossible to over-fill. The twin skip hoist with a capacity of 40 tons per hour of chamber coke, elevates and discharges the coke into the receiving hopper of the coke screening plant.

From the receiving hopper it can be fed into either of two cutting and screening units, arranged in parallel above the coke storage bunkers. Each unit, either of which forms a standby to the other, has a capacity of 40 tons per hour.

The coke is fed by the Locker-Trayler feeder to a Fraser and Chalmers single deck scalping screen which scalps all coke over 2 in. This

large coke passes either into a Corts adjustable cutter or through a by-pass chute and down a spiral chute directly into a large coke compartment of the storage bunkers beneath. The undersize coke from the scalping screen together with any cut coke from the cutter is delivered to a 'Spartan' screen. On this screen, supplied by Robert Cort & Son, Ltd., the coke is graded into four sizes, 0-⅜ in., ⅜ in.-¾ in., ¾ in.-1¼ in., and 1¼ in.-2 in. These sizes are delivered directly into their respective compartments in the storage bunkers beneath.

The five storage bunkers have capacities of 120 tons, 180 tons, 60 tons, 70 tons, and 70 tons, respectively: a total of 500 tons of coke and breeze. There is also a coke stocking ground capable of holding some 17,000 tons. Stocking is carried out either by using road transport direct or grabbing from rail wagons by a mobile crane and grab. Different grades of coke are kept separate by means of Stelcon walls. Recovery from stock is by a Bray mechanical loading shovel or mobile crane and grab into road transport, and tipping on to one of the cooling wharves and thence to the handling and screening plant.

At the base of the bunkers there is a continuous breeze compartment which runs along their entire length. From this, breeze is loaded through eight outlets fitted with single discharge chutes into road transport. At the base of the sized coke bunkers there are also eight outlets, each fitted with a bifurcated chute feeding coke on the one side to road transport and on the other side to rail transport.

On the sloping side of these bunkers seven additional outlets deliver to a band conveyor for the return of producer fuel and pad coke to the chamber house. A further seven outlets on the other sloping side deliver coke by band conveyor to the bagging platform. A static mechanical debreezing screen is fixed above the platform to debreeze the coke from the conveyor.

From the sloping sides of the breeze bunker, two chutes feed direct to rail way wagons on the one side and to road vehicles on the other side.

The gas passes in a single stream from the carbonising plant to the condensers which are by W. C. Holmes & Co., Ltd. They are in two stacks, 33 ft. 1¼ in. high by 8 ft. 7¾ in. wide by 5 ft. 4 in. built in mild steel of the multipass, vertical tube type with a cooling surface of 5,530 sq. ft. and a capacity of 235,000 cu.ft. per hour working in series. There are four gas and water passes in the first stack and four gas and six water passes in the second stack. Inlet and outlet branches for water are provided and cast iron water connections arranged so that recirculated water can be used on both or either condenser, and the town water on the last two passes of either condenser.

Each pass of the condenser is provided with a boss and plug for steaming purposes, and a branch for admitting liquor to flush the condenser when necessary. With two stacks working the outlet gas temperature of the first stack will be 102°F. With only one stack working and circulating 21,000 gal. of water per hour it will be 90°F. The water supply to the plant is controlled automatically by a diaphragm controlled valve, arranged to open if the control fails or, alternatively, the water supply may be hand controlled. It is anticipated that the back pressure thrown on full load will be approximately 1.9 in. w.g.

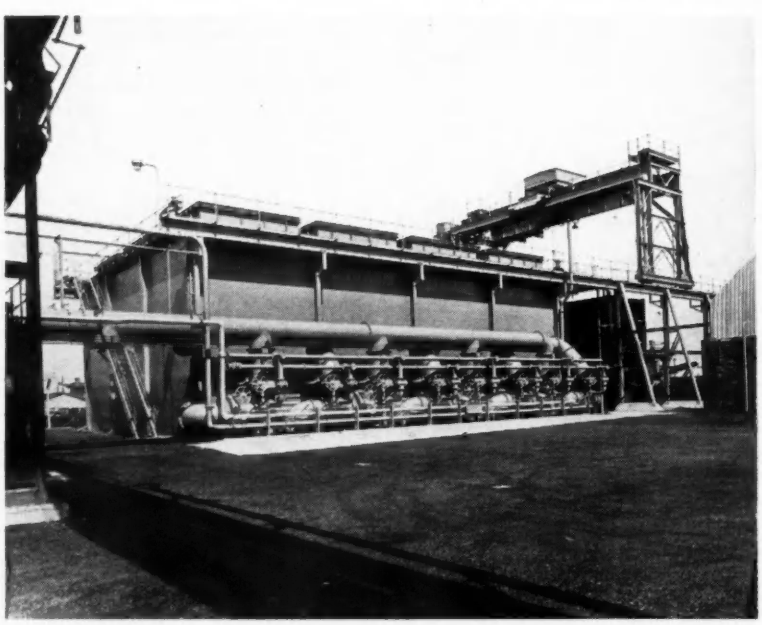
A tar and liquor separating tank is provided for the condensers. The condensate is separated immediately, the liquor being pumped back to the chamber house liquor separating tanks, and the tar passing directly to the main works separator.

The gas stream passes from the condensers to the exhausters, of which there are two with provision for a third; one machine is normally working the other acting as a standby. Both are of the Waller standard type Roots design, driven by Belliss and Morcom two crank compound steam engines, coupled by means of pin type flexible couplings. They are designed for a capacity of 235,000 cu.ft. per hour measured at 65°F. The pressure rise allowed for through the exhauster is 60 in. w.g. (−6 in. to +54 in.) when running at 480 r.p.m. Speed governing is by a hydraulic regulator moving a throttle valve on the engine drive steam line.

High Efficiency

After leaving the exhausters the gas passes to the electro detarrers of the 'Elex' plate type by W. C. Holmes & Co., Ltd. Under normal conditions two units are working in parallel with a guaranteed extraction efficiency of 99% when handling 235,000 cu.ft. of gas per hour. If one detarrer is bypassed for cleaning or maintenance the other will handle the whole of the gas at an extraction efficiency of 97%. Both detarrers may also be worked from a single rectifier set with an extraction efficiency of 98%. The total power consumption is approximately 2½ kW per treater on maximum load. The gas then passes in a single stream to two six-bay ammonia washers of the W. C. Holmes static multifilm type working in series. The unit is capable of reducing the ammonia content of the gas to 2 grains per 100 cu.ft. at its designed capacity of 235,000 cu.ft. gas per hour at a washing temperature of 65°F. When only one washer is in use the slip increases to 7 grains per 100 cu.ft. The washing medium employed is cooled effluent liquor from the C.A.L. plant.

The laying of the foundations for all the ancillary plant except for benzole plant, and the detarrers, but excluding the machine house, the purifiers and the oxide shed, was carried out by G. Dew & Co., Ltd., of



A view of the tray purifiers, showing the gas control valves and the Goliath crane for handling the trays when changing the oxide.

Oldham. Other foundation work was by Harbour and General Works, Ltd. G. Dew & Co., Ltd., were also responsible for laying the surface water channels and the roadways.

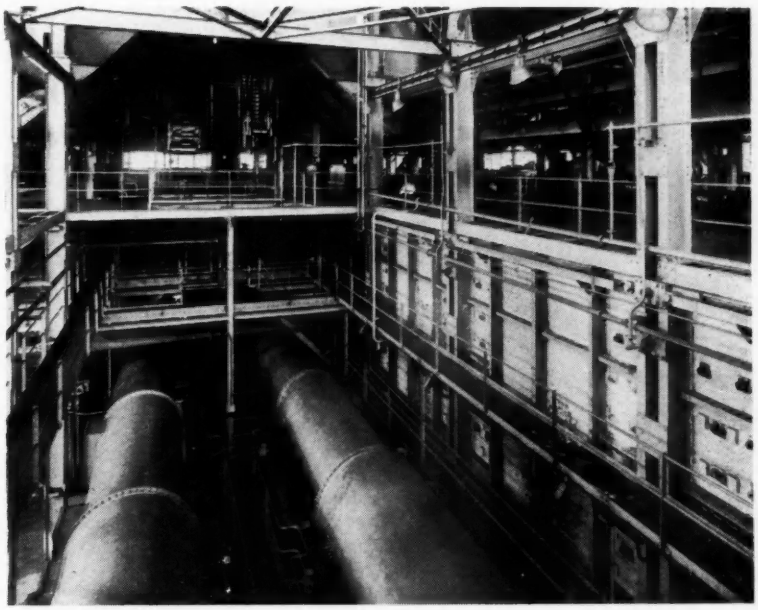
After leaving the ammonia washers, the gas flows through the oxide purifiers, which also have a capacity of 235,000 cu.ft. per hour. Of welded mild steel construction, they are of the tray type built to the Board's specification by R. and J. Dempster, Ltd. Designed as a four-box set capable of extension to five boxes, each box is 45 ft. 6½ in. by 15 ft. 8½ in. by 26 ft. 6 in. deep, built in line as one large box with the necessary division plates. Each can hold 18 trays (three stacks of six deep), but at present only 15 trays are in use. Each tray, which is 12 ft. 6 in. sq. by 3 ft. 10 in. deep, is of welded mild steel construction. It consists of a centre gasway, 18 in. diameter, provided with flanges top and bottom with a groove machined in them for a rubber jointing ring, and a frame of steel tees and angles to accommodate the two tiers of wood grids. The whole of the tray is encased on the four sides by $\frac{5}{16}$ in. mild steel plates. The grids are clipped into position by removable mild steel pegs. Lifting lugs are provided for moving the trays, which are self-located by means of guide angles faced with a hardwood rubbing surface. The box covers are of mild steel $\frac{1}{4}$ in. plate, fitted with a 6 in. diameter turned and bored plug and a test cock.

The Operation

The gas passes through spaces between the trays and the outer casing, upwards and downwards through the tiers of oxide and thence through ports cut in the centre tubes down to the outlet lute in the bottom of the boxes. It then passes to the outlet main or the inlet main of the succeeding box. The boxes are worked in backward rotation by means of 12 30-in. Cort's 'Towndrow' valves manually operated but capable of conversion to remote control. A welded mild steel gas heater with a capacity of 7 mill. cu.ft. of gas per day through 50°F. using steam at 15 lb. per sq. in. is provided at the inlet purifiers.

It may be by-passed when not working. The air supply to the purifiers is supplied by two Waller-Roots blowers in the machine house. With a capacity of 12,000 cu.ft. per hour against a pressure of 60 in. w.g. they are driven by Brauner vee belt from the exhauster engine shaft.

A 'Goliath' 3-motored electric crane handles the trays during oxide changing. It is fitted with an automatic lifting bale and runs on rails fixed to twin iron gantries which are fitted on either side of the boxes at top platform level.



The interior of the chamber house showing the two waste gas mains running down the centre of the house connecting the outlet of the recuperators with the waste heat boilers.

An oxide handling unit is now in operation. It consists of a tray emptying unit, an oxide receiving hopper, and a screw type feeder into an oxide crusher. Ancillary equipment includes a portable oil fired inert gas generator with a capacity of 15,000 cu.ft. of inert gas per hour to provide purge gas when trays are being changed. Revivified oxide is stored in a shed 142 ft. by 53 ft.

From the purifiers the gas enters the benzole washer. Like the ammonia washer this is of the multi-film type with six chambers, but benzole washing is accomplished by one large unit with a capacity of 6.14 mill. cu.ft. per day (255,000 cu.ft. per hour) and not by two in series.

The washing medium is gas oil and the gas flows counter current to it. As previously mentioned intensive benzole washing is practised to reduce the organic sulphur content of the gas sent out from the works. The gas leaves the benzole plant and enters the station meter on its way to the gas holder.

The station meter is a 20 in. by 60 in. Holmes-Connersville of 400,000 cu.ft. per hour capacity, complete with P.V.T.T. recording instruments. The gasholder has been designed and constructed by Newton, Chambers & Co., Ltd., and with its capacity of 750,000 cu.ft. acts as an intermediate storage for the boosters and the compressors which despatch gas to outer holder capacity in Lancaster and Morecambe (Westgate) and supply gas to the grid system beyond Carnforth. The holder is constructed in three ifts and fully inflated will throw a pressure of 16 in. w.g. The bottom tank and each cup are equipped with anti-freeze devices which consist of three steam injectors for each position. The inlet and outlet mains are 24 in. and 30 in. respectively.

The carburetted water gas plant for which the White Lund site was originally chosen by the joint committee of the Lancaster and Morecambe Corporations is situated on the north east corner of the present site. It is complete with its own ancillary plant and relief gas holder of 250,000 cu.ft. capacity.

The machine itself is a Humphreys & Glasgow plant, automatically operated but hand-clinkered, with a capacity of 1.1 mill. cu.ft. per day at 475 B.t.u. per cu.ft.

The plant includes two air blowers installed in a sound-proof room away from the main plant, one of which is electrically driven and in normal use, while the other, steam driven, acts as a stand-by.

Steam for the plant is now taken from the main steam supply generated in the chamber house, but formerly it was raised by a Cochran boiler of 5,500 lb. per hour capacity installed as part of the original plant.

The plant is housed in a particularly attractive, well designed building, constructed to the designs of the Lancaster City architect, which offers plenty of room for the duplication of the present plant.

The ancillary plant consists of spiral

multipass condensers by Humphreys & Glasgow, Ltd., one electrically driven and one steam driven Bryan Donkin blade type exhauster, each of 50,000 cu.ft. per hour capacity, a Livesey washer, four ground level purifier boxes by R. and J. Dempster Ltd., 17 ft. 6 in. sq. by 6 ft. deep, and a station meter. This is of the integrating fan type by George Kent Ltd., with a capacity of 50,000 cu.ft. per hour.

The C.W.G. main connects with the chamber house gas main at a point either before the benzole washer or as the gas stream enters the main purifiers.

As has been said, the new works holder of .75 mill. cu.ft. acts as production or intermediate storage capacity. The actual service holders are those being retained at the old Lancaster works and the Westgate holder.

For this arrangement to be effective, the gas supply to these holders is boosted by two Bryan Donkin Rateau turbine boosters, each of 300,000 cu.ft. per hour, the one steam driven and the other diesel driven, each acting as a standby to the other. A pressure difference of 30 in. w.g. at a speed of 3,900 r.p.m. and absorbing 38.5 h.p. can be maintained. The steam drive is a Greenwood and Batley 'de Laval' steam turbine developing 45 h.p. at 3,900 r.p.m. with steam at 150/190 lb. per sq. in. and 500-550°F., exhausting to atmosphere at 15 lb. per sq. in.

The diesel drive is a 'Ruston' Mark 4 yc cold starting engine developing 48 b.h.p. at 1,500 r.p.m. on a 12 hour rating.

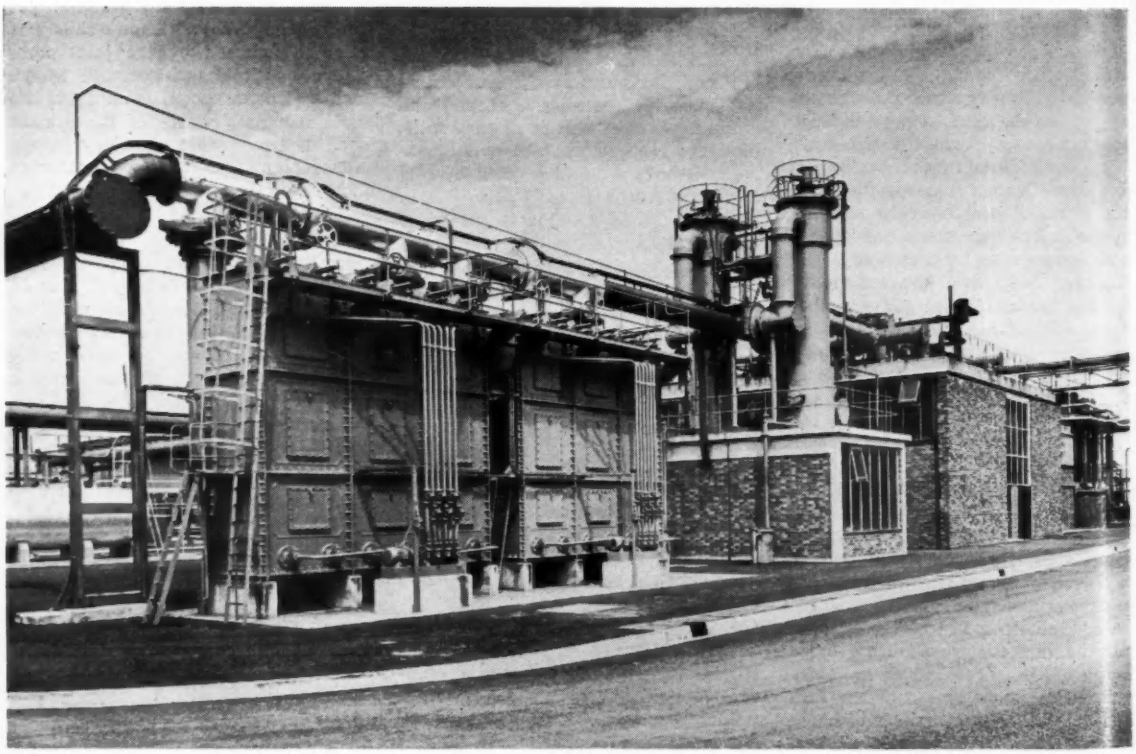
Gas is supplied to the more distant undertakings at a pressure of 11 lb. per sq. in. by one of two Bryan Donkin compressors, each with a capacity of 80,000 cu.ft. per hour. As with the boosters there is a choice of steam or diesel drives, and each machine is standby to the other.

The diesel drive is a 'Blackstone' Mark 'EV3' vertical three-cylinder water cooled engine developing 107 b.h.p. at 530 r.p.m. on a 24 hour rating. These machines have been installed in the machine room which also contains the exhausters and air blowers for the purifiers.

A calorimeter house has been provided at a central point between the chamber house and the purifiers near to the machine room. Here are installed a Fairweather recording calorimeter supplied by Scientific & Projections Ltd., a Boys calorimeter for daily testing and five Sigma recorders for the diluted chamber house gas and the carburetted water gas streams and for the main gas stream entering the holder. Readings from three of these recorders, including the Fairweather, are telemetered to a panel in the instrument room which forms part of the machine house. The electric transmitting unit embodied in the Sigma calorimeters, operates by variation of the air-gap in two iron cored choke coils, which develop a proportional voltage across a sensitive galvanometer. Magnification by this type of head is controlled by the angle of approach of the opposing pole-pieces. To overcome variations in voltage and frequency of the electrical supply which would interfere with the basic variables of the system, a special type of galvanometer has been developed which achieves accuracies of within 10% for voltage and 4% for frequency variations. The transmitting unit in the Fairweather calorimeter has been supplied by Elliott Automation, Ltd.

The works' electric power supply is at 6,600 volts from the public grid to a 500 kVA transformer in the works substation which reduces the voltage to 240/245 for works use.

From the substation electricity is fed to the main distribution board in the alternator room, which forms part of the machine room building. As a stand-by in case of failure of the public supply a diesel driven alterna-



The ancillary plant. The exterior of the machine house is seen on the right. In the centre are the electrostatic detarrers placed on the roof of the building containing their electric control equipment and on the left are the ammonia washers.

or has been installed. It consists of an English Electric revolving field type alternator with an output of 311 kW. 389 kVA at .8 power factor at 415V., 3 phase and 50 cycles, and a possible overload of 10%. The set is driven by an English Electric 6RK, normally aspirated type diesel engine with an output of 450 b.h.p. at 750 r.p.m. on a 12 hour rating.

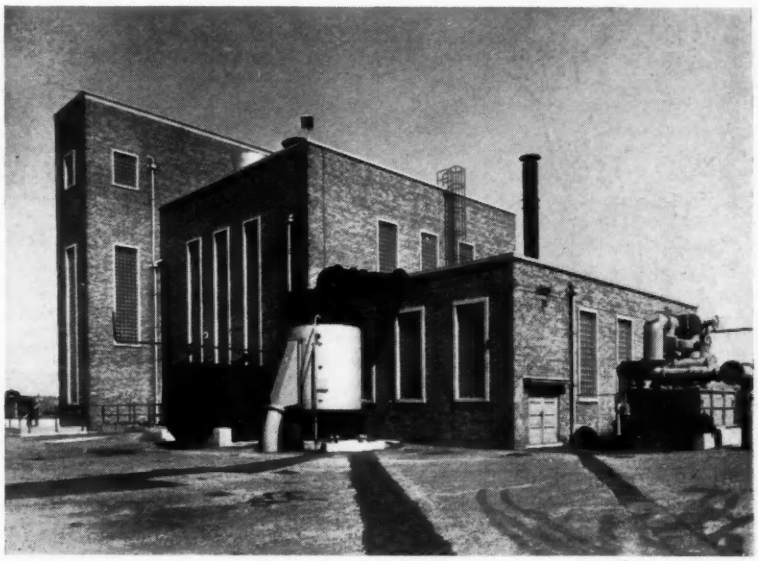
The main distribution board consists of a number of panels each of which is supplied either from the public supply or the diesel alternator and connected to definite sections of the works. Each panel is fitted with an isolating switch and meter so that power consumption can be checked on each section of the plant.

The main switchboards are in the elevated gallery of the alternator room and in the switch room in the chamber house. From these points power is fed to the various motor starters and lighting circuits.

Many of the starters for motors connected with the ancillary plant have also been placed in the alternator room gallery to protect them from the fumes and dirt, while in the coal and coke handling plants, in each of which there is an interlock system to prevent spillage in case of failure, starters have been centralised to form motor control panels.

Hydraulic couplings have been installed where conditions warrant this type of torque control and in every such case an underspeed control switch is provided, driven from the load side of the coupling to stop the supply of material should the motor speed fall below a predetermined minimum. Emergency stop push buttons requiring to be hand reset after operation, as well as trip wires along the coal and coke gantries have been provided.

Other ancillary plant is directly linked with the main works separator while the tar and liquor storage tanks



The exterior of the carburetted water gas plant. The building, of modern design, is built of mixed stock brick with glass block windows. On the left is the oil storage tank and the Humphreys and Glasgow condenser. On the right is the Livesey washer. The section of the building in the foreground contains the stand-by boiler plant.

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have drain lines to the separator. This separator consists of a rectangular concrete tank, internally divided by a 9 in. wall into two halves. Each half, which is further subdivided into three compartments, can be used independently should either need maintenance or cleaning. The three compartments consist of a separating compartment containing baffle walls, a tar storage well and a liquor storage well.

The tar gravitates to the bottom of the separating compartment and is run off periodically to the respective tar well by means of a weir valve and decanting pipe. The liquor flows through the baffled compartments of the separator towards the outside of the tank where it runs off continuously by means of an adjustable take-off pipe set in the division wall between the separating tank and the liquor storage well. An air gap over each partition of the separating compartment prevents an air lock developing and so interfering with the operation of the tank.

Tar and liquor pumps transfer the contents of the separator to the main tar and liquor storage. Tar is stored in an all welded steel tank of 75,000 gal. capacity supplied by the Oxley Engineering Co., Ltd., from which it is loaded into road or rail tanks by electrically driven pumps. Liquor is stored in a cast iron tank of 200,000 gal. capacity from which it flows by gravity as needed to the C.A.L. liquor concentration plant.

This plant, supplied by W. C. Holmes & Co., Ltd., only deals with the free ammonia in the crude liquor. It can handle 600 gal. per hour of crude liquor containing 1.5% of free ammonia to produce a concentrated liquor containing 20% of ammonia by weight, which would not be liable to crystallisation at this concentration at ordinary temperatures. It is designed to operate entirely on exhaust steam at a pressure of 10 lb. per sq. in. gauge at the inlet of the steam meter.

The free ammonia content of the effluent liquor discharged from the plant will not exceed .03% and to obtain the performance specified above, the total steam requirements of the still and dissociator will not exceed 195 lb. per 100 gal. of crude liquor.

The effluent liquor from the plant is discharged into the local council's sewerage system and has consequently to be controlled. The rate of flow per hour, total daily discharge, oxygen absorption content, alkalinity and temperature must all be maintained within certain limits. For this reason the effluent liquor is cooled and stored in two effluent storage (balancing) tanks before passing through a meter into the sewers.

The recovery of crude benzole from the rich benzolised wash oil leaving the benzole scrubbers is carried out in a Holmes benzole recovery plant. This can strip 7,500 gal. per hour of benzolised oil and is designed to recover 85% of the available benzole in the gas as determined by the St. Claire Deville test, and 85% of the carbon disulphide at a maximum throughput of 6.14 mill. cu.ft. of gas per day at a maximum gas washing temperature of 70°F.

In the adjoining compound, storage tanks, consisting of three benzole storage tanks each of 10,000 gal., one debenzolised oil tank of 4,000 gal. and one naphtha storage tank of 3,000 gal. capacity, are kept under gas pressure by means of a 2 in. diameter vent line connected to the washer.

A standard loading column and a Worthington Simpson 3D4 centrifugal pump with a capacity of 8,000 gal. per hour driven by a totally enclosed flameproof motor, are used for loading vehicles for the despatch of crude benzole.

Each cell or tower is timber packed with a pond beneath it and equipped with an electrically driven fan to supply the induced draught. The three units working together will cool 60,000 gal. of water per hour from 120°F. to 65°F. with an ambient temperature of 60°F. Each unit can be worked independently. Water is pumped from the ponds to various parts of the works by two electrically driven pumps of 60,000 gal. per hour capacity.

The works is equipped with a fitting shop, a stores building including a stores yard in which lorries can be unloaded, a car park, cycle stand and a road weighbridge and time office. Offices and laboratories are now under construction. A section of the chamber house over the waste heat boiler house contains ablution rooms, lavatories and locker rooms and a place where shift men may warm up a meal and eat it in a considerable degree of comfort.

The maximum use is made of fluorescent lighting throughout the works both outside and in the chamber house.

With the exception of the photographs on pp. 215 and 222, which are by courtesy of the Woodall-Duckham Construction Co., Ltd., and the photograph on p. 216, all photographs in this article were taken by our Staff Photographer, Stephen Tennant, A.R.P.S.

A week before he opened White Lund, Sir Ian Horobin visited the Midlands Research Station of the Gas Council at Solihull, near Birmingham. After seeing over the station, he said: 'You are creating a completely new gas industry here.' Sir Ian added that if the Government were to invest large sums in the nationalised industries they must see that they were being developed on technically sound lines as well as being properly run administratively. He is pictured here, centre, with Mr. G. le B. Diamond, Chairman, West Midlands Gas Board, left; and Dr. F. J. Dent, Director of the Research Station, before a technical diagram.

GAS ON THE CONTINENT

Effects of Working Hours on Week-end Gas Loads

SINCE the summer of 1956, many industrial plants have been working shorter hours. As a result, the energy supply undertakings have experienced larger variations in the demand curve. The energy demand at week-ends has fallen and, in general, a higher demand is occurring from Monday to Wednesday. An accurate determination of the conditions is, however, made more difficult since, together with the shortened hours, other influences have been acting on the energy demand, e.g., industrial development, outside temperature, weather conditions, etc.

Described here is a method which permits an accurate determination and checking of the influence of shortened working hours on the energy demand at week-ends. The influence of demand development, season and weather conditions, is most easily eliminated if the absolute values of daily gas demand are not compared but instead the level of demand of the individual days of the same week are considered. This has been done by calculating a so-called corrected daily value.

The relationship of the daily demands on the values of a single week must not be determined, since the results would vary too much from week to week to permit the influence of working hours to be seen. The deviation of the corrected daily value is naturally smaller the more daily values are used in the calculation, provided a limited period is chosen. A period of two months was considered suitable. Thus there are eight to nine values for each day; naturally, holidays, etc., are omitted.

In order to correct for the influence of outside temperature, the relationship of the gas demand to the outside temperature is obtained graphically. From a knowledge of the temperature difference between the average temperature of the months considered and that of a given day of the week, the latter can be corrected to the average temperature of the period being considered. The corrected daily values are obtained by setting the maximum average temperature corrected daily value equal to unity and referring the other values to it. The corrected daily values so obtained are free from the normal influences. From these the influences which affect the demand structure itself can be seen.

Extensive research has been carried out by many supply and user undertakings for the years 1953-55. In every case the two-monthly corrected daily values were seen to diverge by only a narrow margin from a fixed average value. In the early months of 1956 conditions were unaltered, but from the middle of 1956, the Saturday and Sunday corrected daily values suddenly began to diverge from the normal. This clearly showed that an influence was at work which was altering appreciably the characteristic of the demand. Such an influence must be the shortening of working hours and the changeover of many undertakings to the five-day week.

Wunsch and F. Tuppeck, Essen. Das Gas-und Wasserfach, Vol. 99, No. 5, January 31, 1958, p. 97, 2 pp., 2 tt.

Fighting Corrosion

THE preparation of the surface before treatment is a fundamental requirement for successful protection against corrosion. Even recently, many authorities permitted the application of paint over strongly adhering mill scale. It is now generally agreed that all mill scale is harmful, causing, above all, galvanic corrosion when it inevitably flakes off.

The only satisfactory surface is one which is completely dry and bare. Removing the rust by hand is usually inefficient and, while machine-driven wire brushes are more effective, undoubtedly the best method is sand blasting. It should, however, be remembered that since paint films are only 150 to 200 microns thick it is essential to use a fine sand to avoid excessive roughness of the surface.

One safe method of surface treatment is to convert rust into a chemically adherent film by phosphating. This is normally only effective for dipping tanks, the temperature of which are closely controlled, although considerable success has recently been achieved with phosphate treatments applied in situ, such as the American wash primers which contain phosphoric acid, passivating chromate pigment and film-forming agents. In general, these coatings are porous and must be filled. Another successful but expensive surface preparation process is metal spraying, e.g., with zinc.

Of almost equal importance as the preparation of the surface are the conditions under which the paint is applied to the surface. Most specifications forbid the application of paint out-of-doors during rain, but few take account of the dew point of the atmosphere. As the ambient temperature approaches the dew point, a film of moisture is deposited on the surface. Thus, painting should be avoided in winter, during damp days, too early in the morning, or too late at night.

To obtain good adherence it is essential that all traces of oil and grease are removed. What are otherwise good conditions for painting may be ruined by the presence of corrosive gases, such as ammonia.

Turning now to the paint itself, the best undercoats in many respects are still the lead paints with 11-15% linseed oil for the first coat and 15-20% linseed oil for the second coat. In this respect, it should be noted that there may be a tendency to overthin the paint in cold weather with resultant loss of film thickness. The addition of chlorine rubbers or phthalene resins to the linseed oil produces a rapidly drying film, which is also harder and more strongly adhering and has improved weather resistance.

For the top coats, the fine-grained cubic particles of pigment are tending to be replaced by film forming substances often containing flake-like particles which form an interlocked layer, thus improving the adherence. Oil-free chlorine rubber paints show particularly good corrosion and weather resistance. Another paint which is not yet generally accepted, but which shows excellent results, even against heat, is the bituminous oil paint using a filler of aluminium powder or asbestos.

K. Krenkler. *Das Gas-und Wasserfach.* Vol. 99. No. 13. March 28, 1958. p. 293. 8 pp., 15 ff.